No. 785,151. PATENTED MAR. 21, 1905.

F. L. CHASE & B. M. YOUNG.

CAR TRUCK.

APPLICATION FILED MAY 28, 1904.

2 SHEETS—SHEET 1.

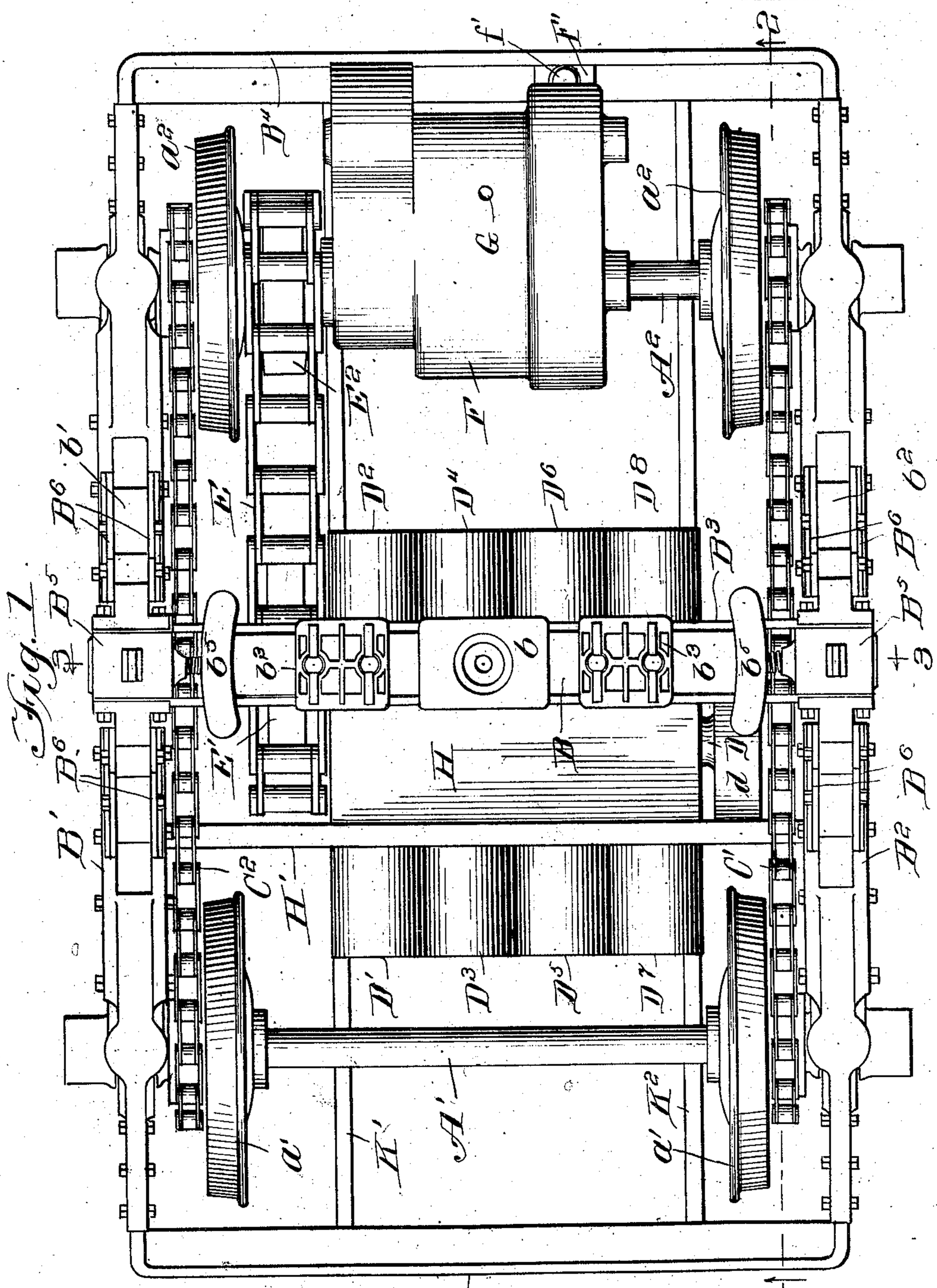

Fig. 1.

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2 SHEETS—SHEET 2

Fig. 2.

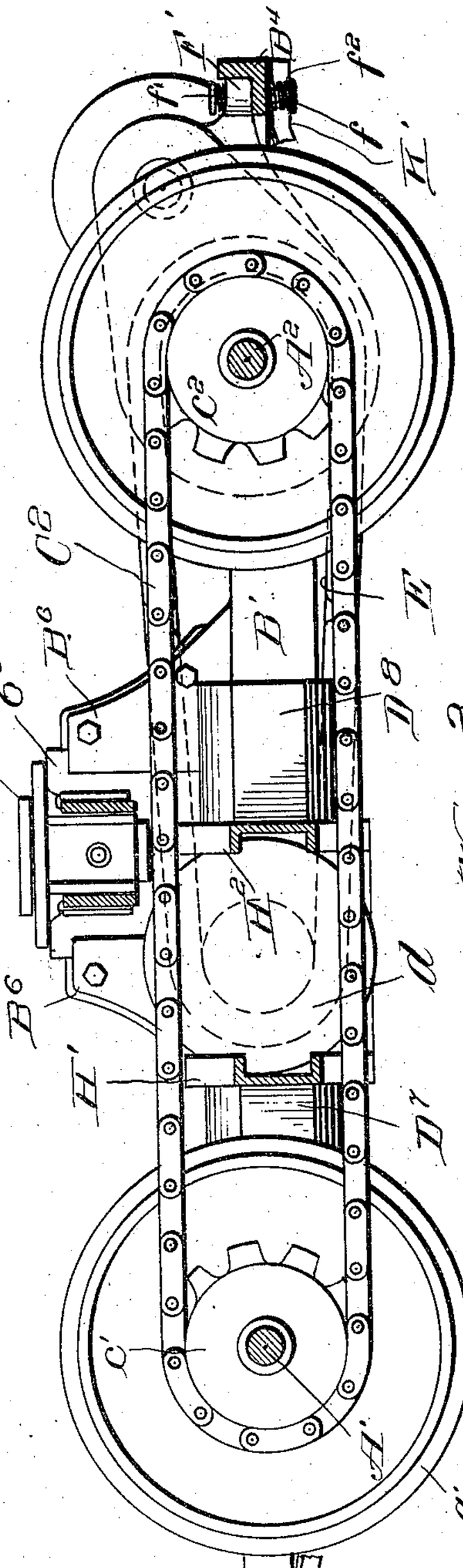
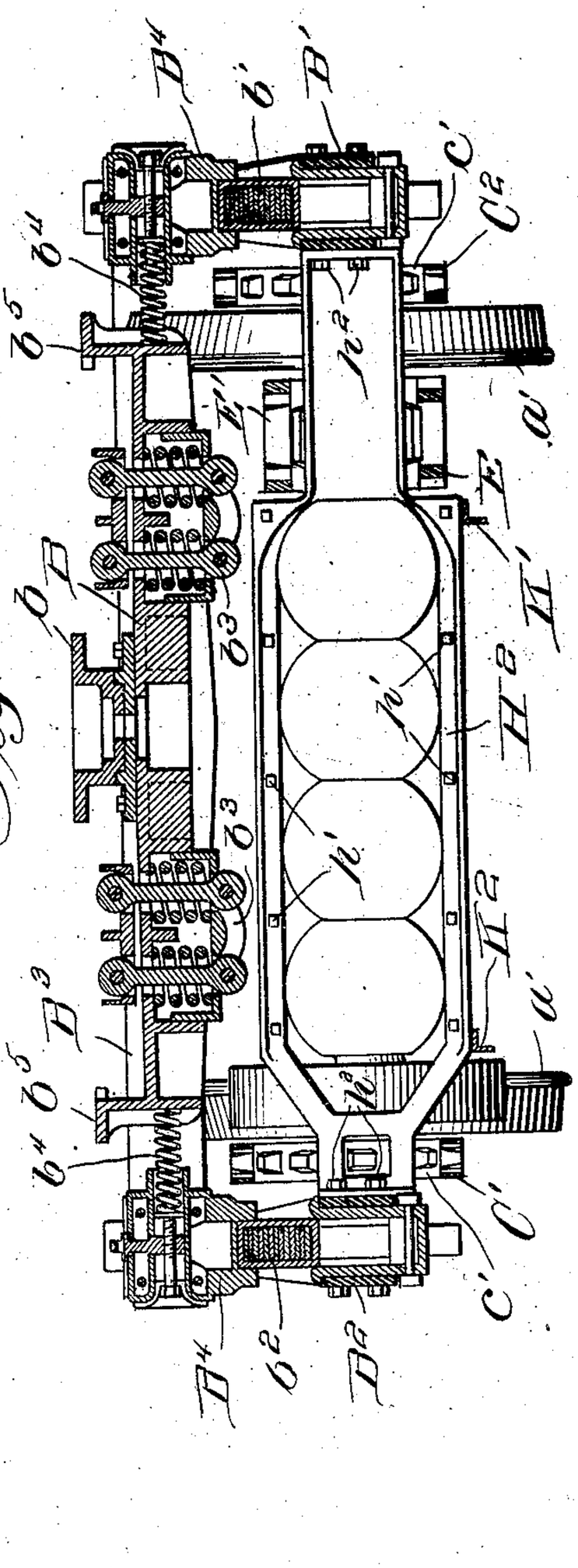


Fig. 3.



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UNITED STATES PATENT OFFICE.

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CAR-TRUCK.

SPECIFICATION forming part of Letters Patent No. 785,151, dated March 21, 1905.

Application filed May 28, 1904. Serial No. 210,183.

To all whom it may concern:

Be it known that we, FRANK L. CHASE and BERTRAND M. YOUNG, citizens of the United States, residing at Jamestown, county of Chautauqua, State of New York, have invented a certain new and useful Improvement in Car-Trucks; and we declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

Our invention relates in general to car-trucks, and more particularly to a truck upon which is mounted an explosive-engine.

As explosive-engines are more economical in operation than other forms of motors, it is desirable to employ them for propelling street and railroad cars, especially on suburban and interurban railroads.

The use of explosive-engines as car-motors has advantages over electric propulsion by dispensing with costly power plant, machinery, poles, and wires and economizing not only in the cost of the power consumed, but also in obviating a great waste of power in that when the car stops the manufacture of power also ceases. It also has advantages over steam propulsion by not only economizing in the cost of the power consumed, but also by obviating the use of costly locomotives, and if used as provided in our invention it obviates the unsatisfactory construction sometimes adopted in steam propulsion in which a portion of the interior of the car-body is occupied by the boiler and machinery.

Inasmuch as it has been found necessary in the operation of railroad-trains at high speeds and with ordinary size of cars to support the car-bodies pivotally upon the trucks, thus giving a flexible connection between the car-body and the truck, it is essential in order that explosive-engines may practicably be used as the propelling power that the engines and transmission and other mechanism should be entirely mounted on the trucks. It is also very desirable that none of the interior of the car be obstructed by the engine or machinery. All parts of the propelling mechanism should be below the bottom of the car-body.

The primary object of our invention is to provide a self-propelled car-truck adapted to pivotally support the car-body, with a multiple-cylinder explosive-engine supported entirely upon the truck and operatively connected to all wheels of the truck through differential transmission mechanism, whereby the car may be operated in either direction at will and the speed of the car may be varied with or without varying the speed of the engine, the engine and all propelling mechanism being below the level of the car-body, thus not interfering with the car-body itself and also affording free radiation of the heat from the engine without unnecessarily heating the car.

A further object of our invention is to provide a self-propelled car-truck wherein the engine and truck-frame are connected rigidly together, but having a flexible connection between the engine and the truck-wheels, thus permitting the wheels and axles to have an independent vertical movement to adapt themselves to any inequalities in the surface of the rails without subjecting the engine and its parts to sudden shock, having also a flexible connection between the truck-frame and the car-body, thus giving the car-body an easy and comfortable movement and preventing the transmission to it of any vibration from the engine or machinery or any shock from the truck-wheels.

A further object of our invention is to provide a self-propelled car-truck which will be comparatively simple in construction, efficient in use, and economical in operation, conforming in shape and dimensions to usual railroad practice and being a truck which can readily be adapted to any ordinary railroad-car body with practically no change in the car-body itself.

Our invention, generally described, consists in a car-truck adapted to pivotally support a car-body, a plurality of opposed engine-cylinders intermediate of the axles and truck-wheels, a crank-shaft parallel to the axles and located between opposed cylinders of the

engine, a differential transmission-gearing mounted on one axle, flexibly operative connections between the crank-shaft and transmission-gear, sprocket-wheels fixed to the axles between the wheels and axle-boxes, sprocket-chains operatively connecting corresponding sprocket-wheels, transverse hangers surrounding the cylinders at each side of the crank-casing and scured at their ends to the side sills of the truck-frame, and longitudinal hangers connecting the engine to the end sills of the truck.

Our invention will be more fully described hereinafter with reference to the accompanying drawings, in which the same is illustrated as embodied in a convenient and practical form, and in which—

Figure 1 is a plan view; Fig. 2, a sectional view on line 2 2, Fig. 1; and Fig. 3, a transverse sectional view on line 3 3, Fig. 1.

The same reference characters are used to designate the same parts in the several figures of the drawings.

Reference-letters A′ and A² designate axles upon which are secured pairs of wheels *a′* and *a²*. The ends of the axles are supported in journal-boxes carried by a truck-frame comprising side sills B′ and B², connected at corresponding ends by end sills B³ and B⁴. The side sills are formed of parallel plates, between which are seated the lower ends of leaf-springs *b′* and *b²*. Mounted upon the springs *b′* and *b²* are supports B⁵, to which the opposite ends of the transom B³ are secured. The transom-supports B⁵ are provided with short extensions on either side of the transom which are vertically guided between plates B⁶, mounted upon the side sills of the truck-frame.

B designates the truck-bolster, which is interposed between the parallel portions of the transom B³. Suitable spring-hangers *b³* are interposed between the transom and the truck-bolster and are shown as consisting in links depending from plates which overlie the upper edges of the transom and support at their lower ends coil-spring seats, the coil-springs being interposed between the seats on the hangers and the under surface of the truck-bolster.

b designates a center bearing upon the truck-bolster for pivotally supporting the car-body.

b⁵ b⁵ designate side bearings at the ends of the truck-bolster, which are extended, as shown in Fig. 1, in the form of arcs of a circle described around the center bearing, so as to permit a relative rotary motion between the truck and the car-body.

b⁴ b⁴ designate lateral-motion springs interposed between the end supports B⁴ of the transom and the adjacent ends of the truck-bolster. The tension of the springs *b⁴* is preferably adjustable by any suitable means—such, for instance, as bolts in screw-threaded engagement with bearings carried by the transom-supports B⁴.

Secured to the axle A′ intermediate of the wheels and the journal-boxes are sprocket-wheels *c′*, while similar sprocket-wheels are fixed upon the axle A² between the wheels *a²* and the axle-boxes, in which the ends of the axles are journaled. Sprocket-chains C′ and C² connect corresponding sprocket-wheels on the two axles A′ and A².

The construction of the truck is such that a space is formed beneath the truck-bolster and transom and between the side sills of the truck-frame to receive a multiple-cylinder explosive-engine. Such engine is shown as consisting in eight cylinders D′ to D⁸, which are arranged in opposed pairs on opposite sides of a crank-shaft D. A sprocket-wheel E′ is fixed upon one end of the crank-shaft, while the other end is provided with a fly-wheel *d*.

E designates a sprocket-chain which operatively connects the sprocket-wheel E′ and the sprocket-wheel E², concentrically surrounding one of the axles—as, for instance, A²—and operatively connected to a differential transmission mechanism of any suitable type.

F designates the casing mounted upon the axle A² and which surrounds the transmission mechanism.

G designates an opening in the casing F, through which a rod or other device for controlling the transmission mechanism passes. The transmission-casing F is provided with a lug F′, which overlies a lateral flange projecting inwardly from the end sill B⁴ of the truck-frame. In order that the casing F may have a slight movement relative to the truck-frame, a rod *f* extends through registering holes in the lug F′ and flange on the truck-frame and is surrounded by coil-springs *f′* and *f²*, one located above the lug and the other beneath the flange on the truck-frame, confined between the same and enlargements on the ends of the rod *f*.

Any suitable means may be provided for securely supporting the engine upon the truck-frame—such, for instance, as transverse frames H′ and H², the ends of which are secured by suitable fastening devices, as bolts *h²*, to the inner surface of the side sills B′ and B² of the truck. The frames H′ and H² are open, so as to surround the cylinders at each side of the crank-casing H. Suitable fastening devices—such, for instance, as bolts *h′*, as shown in Fig. 3—are provided for connecting the frames H′ and H² to the crank-casing. Longitudinal braces K′ and K² are also preferably provided for insuring a strong support for the engine, which extend from the end sills B³ and B⁴ of the truck-frame. These braces are preferably secured by bolts or other fastening devices beneath the inturned flanges of the end sills of the truck-frame and extend beneath the crank-casing of the engine.

The manner of constructing our improved invention will be readily understood from the foregoing description, and its operation may

be briefly described as follows: The reciprocations of the pistons within the engine-cylinders rotate the crank-shaft D, which in turn, through the sprocket E′ and sprocket-chain E, imparts rotary motion to the transmission mechanism through the sprocket-wheel E^2. The speed of rotation of the axle A^2 may be controlled by the transmission mechanism and is communicated to the other axle, A′, by the sprocket wheels and chains fixed to the axles. The operation of the engine and transmission mechanism is in no wise affected by the movement of the truck relatively to the car-body which it supports, inasmuch as the entire propelling mechanism is mounted directly upon the truck, and as the wheels themselves are permitted vertical movement independent of the truck, engine, or car-body a facility of movement of the various parts results on account of the flexibly-operative mechanism.

From the foregoing description it will be observed that we have invented a car-truck so constructed that space is provided for a multiple-cylinder engine, which is directly supported upon the truck and below the truck-bolster and transom. It will be further observed that in our invention both axles of the truck are connected to the motor, so that all of the wheels of the truck are drivers.

While we have described more or less precisely the details of construction, we do not wish to be understood as limiting ourselves thereto, as we contemplate changes in form, the proportion of parts, and the substitution of equivalents as circumstances may suggest or render expedient without departing from the spirit of our invention.

Having now fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a car-truck, the combination with a truck-frame, of a transom mounted above the side sills of the truck-frame, a multiple-cylinder explosive-engine located beneath the transom and between the side sills of the truck-frame, means for securing the engine to the truck-frame, and means for operatively connecting the engine to an axle of the truck.

2. In a car-truck, the combination with a truck-frame, of a transom mounted above the side sills of the truck-frame, a multiple-cylinder explosive-engine located beneath the transom and between the side sills of the truck-frame, transverse hangers supporting the engine and secured at their ends to the side sills of the truck-frame, and means for operatively connecting the engine to an axle of the truck.

3. In a car-truck, the combination with a truck-frame, of a transom mounted above the side sills of the truck-frame, a multiple-cylinder explosive-engine located beneath the transom and between the side sills of the truck-frame, transverse hangers supporting the engine and secured at their ends to the side sills of the truck-frame, longitudinal bars secured at their ends to the end sills of the truck-frame and extending beneath and supporting the engine, and means for operatively connecting the engine to an axle of the truck.

4. In a car-truck, the combination with a truck-frame, of a transom mounted above the side sills of the truck-frame, a truck-bolster supported by the transom and adapted to pivotally support the car-body a multiple-cylinder explosive-engine located beneath the transom and between the side sills of the truck-frame, means for securing the engine to the truck-frame, and means for operatively connecting the engine to an axle of the truck.

5. In a car-truck, the combination with a truck-frame, of a transom mounted above the side sills of the truck-frame, a multiple-cylinder explosive-engine located beneath the transom and between the side sills of the truck-frame, means for seeuring the engine to the truck-frame, a transmission mechanism mounted upon an axle of the truck and adapted to rotate the same, and power connections interposed between the engine and transmission mechanism.

6. In a car-truck, the combination with a truck-frame, of a transom mounted above the side sills of the truck-frame, a multiple-cylinder explosive-engine located beneath the transom and between the side sills of the truck-frame, means for securing the engine to the truck-frame, a transmission mechanism mounted upon an axle of the truck and adapted to rotate the same, a casing surrounding the transmission mechanism through which the axle extends, and means for yieldingly connecting said casing to the adjacent end sill of the truck-frame.

7. In a car-truck, the combination with a truck-frame, of a multiple-cylinder explosive-engine located between the side sills of the truck-frame, a transmission mechanism mounted upon an axle of the truck and adapted to drive the same, a casing surrounding the transmission mechanism through which the axle extends, means for yieldingly connecting said casing to the adjacent end sill of the truck-frame, and power connections interposed between the engine and transmission mechanism.

8. In a car-truck, the combination with a truck-frame, of a transom mounted above the side sills of the truck-frame, a multiple-cylinder explosive-engine located beneath the transom and between the side sills of the truck-frame, transverse hangers supporting the engine and secured at their ends to the side sills of the truck-frame, a transmission mechanism mounted upon an axle of the truck-frame and adapted to drive the same, a casing surrounding the transmission mechanism through which the axle extends, means for yieldingly connecting said casing to the adjacent end sill

of the truck-frame, and power connections interposed between the engine and transmission mechanism.

9. In a car-truck, the combination with a truck-frame, of a transom mounted above the side sills of the truck-frame, a multiple-cylinder explosive-engine located beneath the transom and between the side sills of the truck-frame, transverse hangers supporting the engine and secured at their ends to the side sills of the truck-frame, longitudinal bars secured at their ends to the end sills of the truck-frame and extending beneath and supporting the engine, a transmissiom mechanism mounted upon an axle of the truck-frame and adapted to drive the same, a casing surrounding the transmission mechanism through which the axle extends, means for yieldingly connecting said casing to the adjacent end piece of the truck-frame, and power connections interposed between the engine and transmission mechanism.

10. In a car-truck, the combination with a truck-frame, of a transom mounted above the side sills of the truck-frame, a multiple-cylinder explosive-engine located beneath the transom and between the side sills of the truck-frame, means for securing the engine to the truck-frame, a transmission mechanism mounted upon an axle of the truck and adapted to rotate the same, and power connections interposed between the axles of the truck whereby the engine drives both axles.

11. In a car-truck, the combination with a truck-frame, of a transom mounted above the side sills of the truck-frame, a multiple-cylinder explosive-engine located beneath the transom and between the side sills of the truck-frame, means for securing the engine to the truck-frame, a transmission mechanism mounted upon an axle of the truck and adapted to rotate the same, power connections interposed between the engine and transmission mechanism, sprocket-wheels fixed upon each axle, and sprocket-chains connecting corresponding sprocket-wheels on the axles.

In testimony whereof we sign this specification in the presence of two witnesses.

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Witnesses:
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