No. 788,407. PATENTED APR. 25, 1905.

E. HUBER.

FRAME FOR AUTOMOBILES.

APPLICATION FILED NOV. 12, 1902. RENEWED MAR. 20, 1905.

2 SHEETS—SHEET 1.

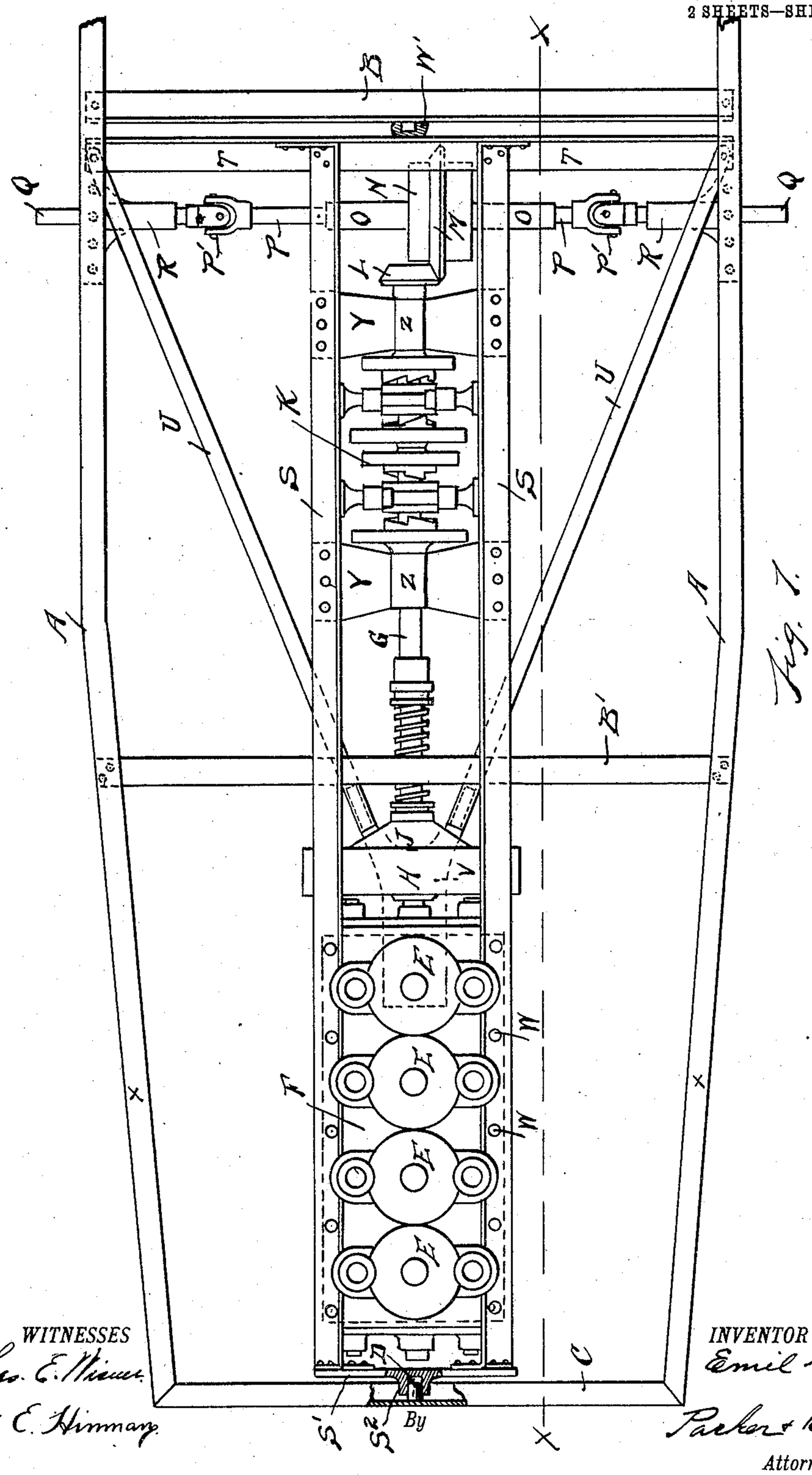

Fig. 1.

WITNESSES
Chas. E. Wiener
Roy E. Hinman.

INVENTOR
Emil Huber
Parker & Burton
Attorneys.

No. 788,407. PATENTED APR. 25, 1905.

E. HUBER.

FRAME FOR AUTOMOBILES.

APPLICATION FILED NOV. 12, 1902. RENEWED MAR. 20, 1905.

2 SHEETS—SHEET 2.

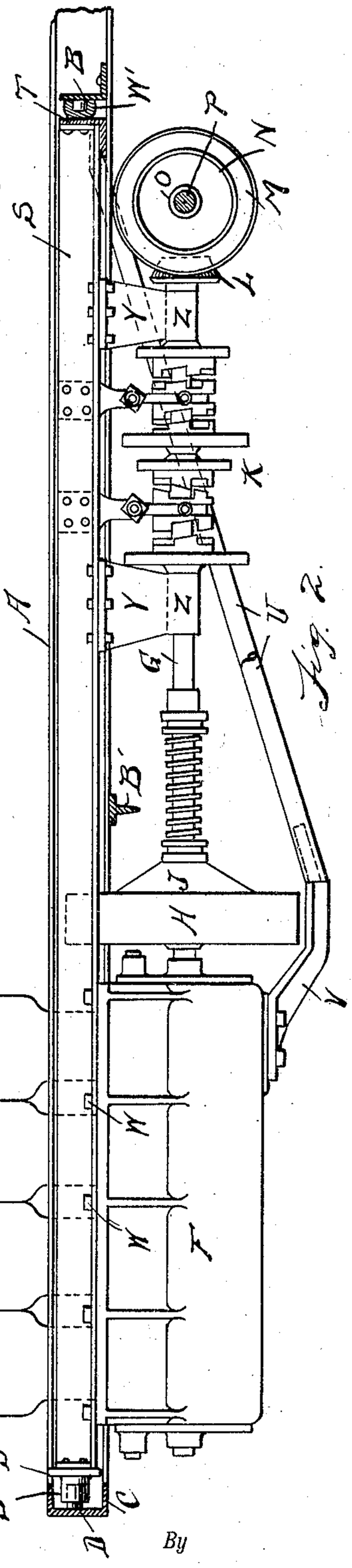

Fig. 2.

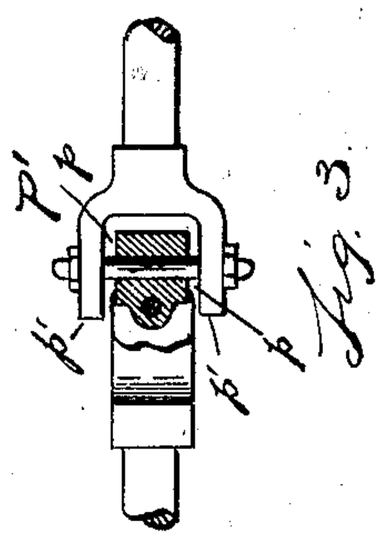

Fig. 3.

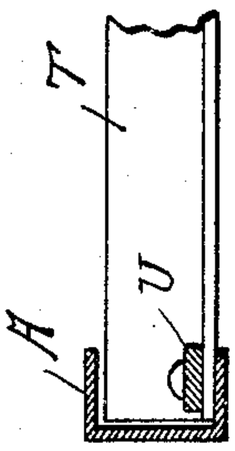

Fig. 4.

WITNESSES

Chas. E. Wiener.

Roy E. Hinmann.

INVENTOR

Emil Huber

By Parker & Burton

Attorneys.

No. 788,407. Patented April 25, 1905.

UNITED STATES PATENT OFFICE.

EMIL HUBER, OF DETROIT, MICHIGAN.

FRAME FOR AUTOMOBILES.

SPECIFICATION forming part of Letters Patent No. 788,407, dated April 25, 1905.

Application filed November 12, 1902. Renewed March 20, 1905. Serial No. 251,005.

To all whom it may concern:

Be it known that I, EMIL HUBER, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Frames for Automobiles; and I 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.

My invention relates to subframes or supports for the engine and driving machinery of automobiles; and it consists in the arrangement and combinations hereinafter described, and specified in the claims.

Heretofore in large automobiles, especially those used for delivery-wagons and others of that class and in which the frames rest upon platform-springs, it is found impossible to prevent the frames from springing when subjected to torsional strains due to inequalities in the road. These strains are transferred to the driving machinery, if such machinery be rigidly connected therewith, with the result that the driving machinery is repeatedly thrown out of line at various times until breakages occur and also with the effect of requiring a much larger expenditure of power to reach the same driving result.

The object of my invention is to entirely avoid torsional or twisting strains on the frames which support the machinery and to prevent the torsional strains on the main frame from being transferred to and affecting such subframe supporting the machinery.

In the drawings, Figure 1 is a plan view of my invention. Fig. 2 is a vertical elevation thereof with one side of the main frame removed on line X X of Fig. 1 for the purpose of showing details of the arrangement. Fig. 3 illustrates the special form of universal coupling which I use. Fig. 4 is a cross-sectional view at the extreme corner of the subframe, showing the mode of attachment of one of the braces.

Similar letters refer to similar parts.

In the drawings, A represents the side bars A A of the main frame, of which only the front section in the drawing is shown, it being broken away at the top of the drawing somewhat in advance of the connections with the main axle of the driving-wheels. B is a cross-bar uniting the said frames A in front of the driving-wheels. B′ is another cross-bar uniting said frames A, and C is the front cross-bar of the frame. The point of attachment of the front springs to the frame is located at about X X on the main frame; but for the purpose of clearness neither springs nor front axle are shown. The main frame A A, together with the tie-pieces B B′ C, are made of rolled angle-steel in the usual form, and the parts specified are firmly united together. Firmly attached to the cross-bar C is a pivoted pin D.

The engine shown for the purposes of illustration is a four-cylinder four-cycle explosive-engine, the cylinders of which are marked E E. About the engine there is nothing new in itself, the cylinders being upright and single-acting and having all of the usual attachments of sparking plugs, battery connections, gasolene connections, &c., none of which are shown. Below the cylinders is a crank-shaft (not indicated) located within a crank-pit or crank-casing F, which casing is common to all of the cranks, and the cylinders E E preferably make an inclosed chamber, which may be used as an oil-pit. Centrally through the case runs the shaft, the outer portion of which appears at G. This shaft carries a fly-wheel H and has the usual friction-clutch J, with means for controlling it, and also located on the line of the shaft is the variable transmission-gearing K; but as the transmission-gearing and their details are no portion of my invention I have merely indicated their location and have not attempted to explain any of the details, such details being familiar to those skilled in the art. The end of the shaft G terminates in a bevel-pinion L, and this engages a bevel-wheel M. This in turn is mounted upon the usual differential gear N, and to each side thereof, journaled in appropriate journals O O, are shafts P P, which terminate in universal couplings of the usual type, except a slight modification shown in Fig. 3, and these in turn are connected to continuations of the shaft Q Q,

journaled in appropriate journals R R, firmly attached to the main frame and upon the extremities of which are carried the usual sprocket-wheels for driving independently the rear driving-wheels, such driving-wheels being loosely mounted upon the rear axle in the usual form.

The subframe is constructed with two substantially parallel longitudinal angle-beams S S, which extend from one extremity to the other of all the driving machinery shown and described. The beams S S are united at the front end by a cross-bar S′, to which is firmly attached a thimble or step bearing S^2. (Shown in horizontal section in Fig. 1 and in elevation in Fig. 2.) This engages the bearing D in the main frame in such manner as to permit of a rotary swiveled action in a perpendicular plane of the subframes S S upon the bearing at the front end. The rear ends of the side bars S S are united by cross-bar T, also, preferably, made of angle-iron, the ends of the bar T respectively resting upon the flanges of the angle-iron or angle-bars of the main frame A in the manner shown in Fig. 4 without being attached in any manner to the bars A, and it will be noted that they fall short a short distance from coming in contact with the bar B, which rigidly unites the main frames A A. As the bar T at either end rests upon the flange of the side bars A A of the main frame, they are adapted to freely slide forward and backward a certain distance, the only resistance to such sliding being the friction and a buffer-spring.

Bolted to each end of the bar T is a stiff tubular bar U. These bars extend diagonally forward, as shown in Fig. 1, and downward, as shown in Fig. 2, are substantially triangularly arranged, and are firmly attached at the apex of the triangle underneath and beyond the balance-wheel H to a casting V, which is also firmly attached to or may be cast as a part of the crank-case F. These braces U U resist torsional strains. The two main side bars S S of the subframe are also firmly bolted to the casting comprising the cylinders by through-bolts W W. They are also firmly united by stirrup-bearings Y Y, within which is journaled at Z Z the main shaft. Thus the subframe carries all of the machinery, with the exception of the rear sprocket-chains and the extremities of the driving-shaft Q, the driving-shaft being so connected by the clutch-couplings P′ P′, a detail of which is shown in Fig. 3, that a certain amount of vertical play can be given to either one, and this is accomplished by cutting away the blocks at *p p*, which fit between the blocks *p′ p′* of the clutch. This prevents any springing of the shaft P by reason of any springing of the frames. It is also obvious that the frames S S, united as they are, form a strictly rigid frame, which is adapted to resist torsional strains and upon which no torsional strains are brought by the main frame and which is also adapted to yield to endwise strains by not being firmly attached to the subbars A A of the main frame. Any torsional strain upon the main frame A A causing it to twist on the line of the shafts Q Q would be transferred by the cross-bars T T to the subframe S S, which would turn freely upon the bearing at D, whereas if it was rigidly attached at D the tendency would be to twist the frame and throw the shaft out of line.

At W′, I have shown an elastic buffer between the cross-bar T and a cross-tie of the main frame. This buffer keeps the bearing D in engagement and allows a slight endwise movement of the subframe, preventing destructive shocks.

By not uniting the cross-bar T to the side frames A A any diagonal strains brought to bear upon the main frame A A are not transferred to the subframe S S, because either end of the cross-bar T is formed to slide, and such diagonal strains are resisted by the braces U U.

It is obvious that the subframe made by the side bars S S may be so located longitudinally with reference to the cylinders E E, crank-case, crank-shaft F, and fly-wheel H as to be substantially in the plane of the center of gravity of that portion of the structure, and thereby that sudden side movements of the front end of the vehicle would not tend to twist the subframe, as it would tend to do if the center of gravity was markedly above or below the plane of the frame and its pivoted point at D. Such sudden motions would be liable if the center of gravity was much above or below the line or plane of the pivoted point at D to twist the subframe by the resistances to said motions due to the inertia of the heavier top or bottom of the machinery attached thereto. This tendency to twist would be resisted to some extent by the bearing of the cross-bar T upon the main frame.

In the foregoing description I have only described so much of the device as is necessary to correctly understand the principles of my invention, which in this application are limited to the general structure of the subframe, its connections and bearing, and the necessary modifications.

What I claim is—

1. In a vehicle, the combination of a main frame, a subframe rotatably pivoted at its front end to the main frame and supported at its rear end by bearings resting upon but detached from the main frame, said subframe carrying the machinery of the driving mechanism, and whereby the twisting strains brought to bear upon the main frame are entirely relieved from the subframe and the machinery carried by it, substantially as described.

2. In a vehicle, the combination of a main frame, a subframe rotatably pivoted at its

front end to the main frame and supported at its rear end by bearings resting upon but detached from the main frame, said subframe carrying the machinery of the driving mechanism, and a cross-shaft containing universal couplings whereby the twisting strains of the main frame are not transmitted to the cross-shaft, substantially as described.

3. In combination with the main frame of a vehicle, a subframe adapted to and carrying the driving mechanism, which subframe is supported upon three points forming a triangle, namely, a front support adapted to swivel in a perpendicular plane, and two rear bearing-points upon the main frame, substantially as described.

4. In a vehicle, a sub-frame supported on three points, one of which is rotatable in a perpendicular plane, and the other two supported by the main frame, and diagonal braces running from the supporting-points at the base of the triangle and to a common point in conjunction with the subframe, substantially as described.

5. In a vehicle, a subframe adapted to carry machinery, driving mechanism rigidly attached thereto, said subframe being supported on three points forming a triangle, the apex being a swiveled joint in a perpendicular plane, and the other two points at the base of the triangle being supported by the main frame, said subframe being substantially in the plane of the center of gravity of said driving mechanism, substantially as described.

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

EMIL HUBER.

Witnesses:
R. A. PARKER,
NETTIE V. BELLES.