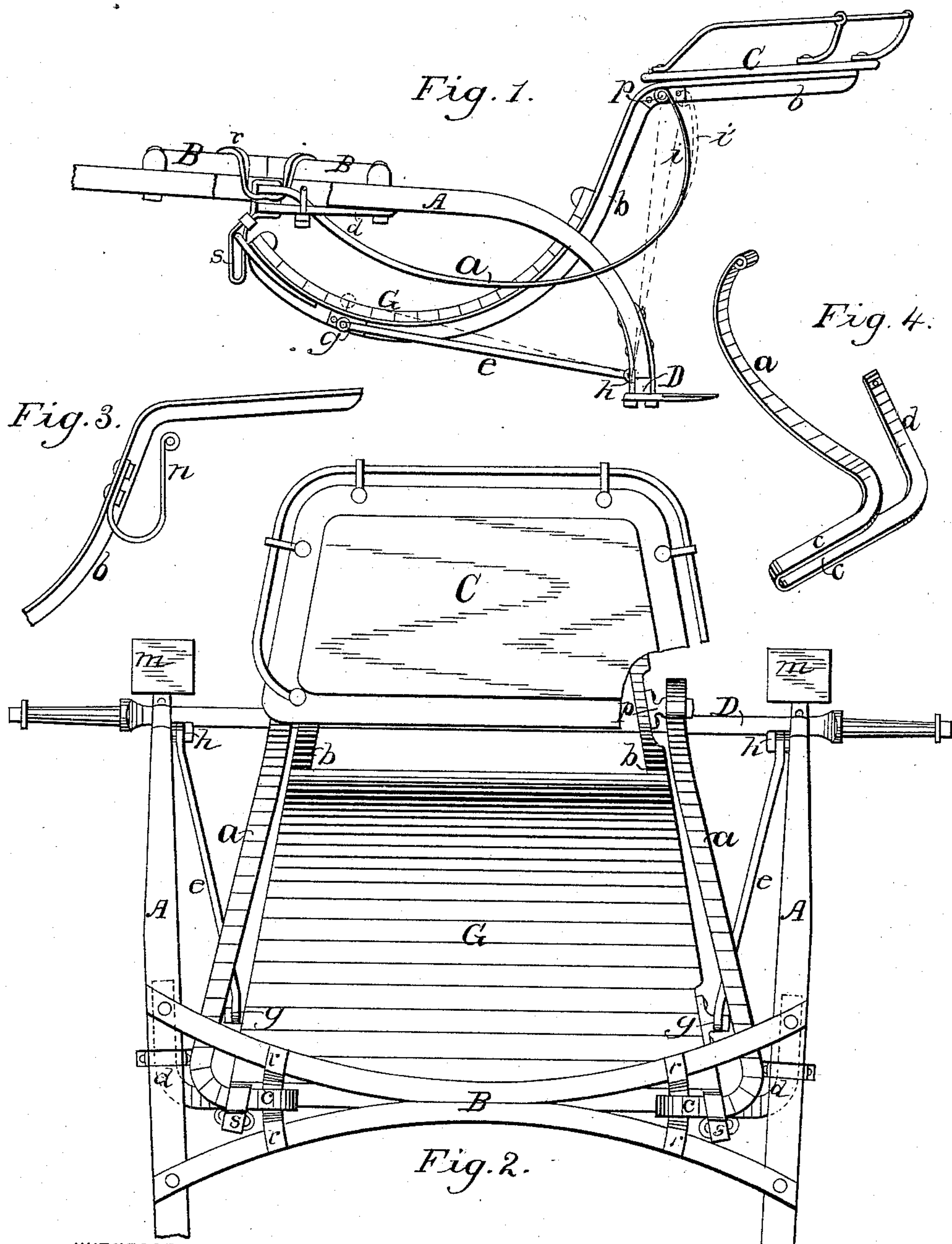


(No Model.)

E. F. MORSE.
TWO WHEELED VEHICLE.

No. 432,889.

Patented July 22, 1890.



WITNESSES:

Sanford J. Londe
Chauncey P. Kuegg.

INVENTOR:

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UNITED STATES PATENT OFFICE.

EVERETT F. MORSE, OF TRUMANSBURG, NEW YORK.

TWO-WHEELED VEHICLE.

SPECIFICATION forming part of Letters Patent No. 432,889, dated July 22, 1890.

Application filed January 22, 1890. Serial No. 337,714. (No model.)

To all whom it may concern:

Be it known that I, EVERETT F. MORSE, a citizen of the United States, residing at Trumansburg, in the county of Tompkins and State of New York, have invented certain new and useful Improvements in Two-Wheeled Vehicles, of which the following is a specification.

The objects of my invention are to provide an easy-riding two-wheeled vehicle the body of which shall be wholly or largely relieved from the disagreeable motion usually transmitted from the horse and commonly known as "horse motion;" and it consists of a peculiar way of hanging the body to the fixed parts of the vehicle, whereby it is free to yield vertically to compensate for uneven roads and also to rock in a plane perpendicular to the axle, whereby it is relieved from the vibratory horse motion. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a part of a vehicle with my improvements attached. Fig. 2 is a top view of the same. Fig. 3 is a detail view of a modified form of a part of my anti-horse-motion device. Fig. 4 is a perspective view of one of my springs.

Similar letters refer to similar parts throughout the several views.

Referring to the drawings, D is the axle; A, the thills, securely attached to the axle; and B, the cross-bars extending between and bolted to the thills.

The body, which in the present case consists simply of the seat C and foot-rest G, rigidly connected together by bent bars b, is connected with the fixed parts of the vehicle by two sets of arms a and e, which extend in nearly horizontal directions and longitudinally of the vehicle. One set a of these arms is arranged above the other set e, and each set has one end attached to the fixed parts of the vehicle and the other to the body in a manner that permits each of the arms to turn in a vertical plane relatively to both the body and fixed parts of the vehicle. The arms a and e, thus arranged and connected, permit the body to move vertically through a limited distance by their angular motion, and at the same time the body is restrained from tipping forward or backward by these arms, ex-

cept as described below. While the body, connected to the fixed parts of the vehicle, as described, can be supported vertically by any of the springs commonly used on two-wheeled vehicles, the vehicle can be much simplified and the body suspended from a high point by combining the upper arms a with the supporting-springs, which in the present case are substantially the same as the springs described in Letters Patent No. 417,267, granted to me December 17, 1889, and consist of arms d, rigidly attached to the fixed parts of the vehicle, preferably to the thills, the two substantially parallel torsional branches c c, extending transversely of the vehicle and rigidly connected together at one end and to the arms d and a, respectively, at the other ends. The arms a, which extend on either side of the body, are curved downward, as shown, and have their ends pivotally connected to the body near the seat. The downward-curved form of arms a, besides making the vehicle more easy to get into and out of, provides the body, through the bending of said arms, with a yielding resistance to rocking forward and backward about the pivot-pins h.

The ends of the torsional branches c c, which are connected together, are supported by the loops x, which have their ends bent so as to pass over the cross-bars B, and their central portions bent downward and under one of the torsional branches, thus supporting the free ends of the torsional branches from dropping downward under the load of the body.

The lower arms e have one end pivotally connected to the lower part of the body just below the foot-rest G, and the opposite end to the butt-end of the thills. The pivotal connections of both upper and lower arms consist simply of pivot-pins p, g, and h, which are securely attached to the body and thills, respectively, and receive the eyes of their respective arms, as shown.

The location of the pivot-pins g and h are such that the path of the pin g as the body is depressed will approach as near as possible to parallelism to the path of the pin p. This approximation can be attained near enough to meet the practical requirements when the upper and lower arms a and e extend from their respective connections with the body in

opposite directions, as shown in the drawings; but, if desired, a closer approximation to parallelism to said path can be obtained by extending the arms *a* and *e* in the same direction from the body.

Safety-straps *s s* connect the forward end of the body with the torsion branches *c* or bars *B*.

If the upper arms *a* are rigid, an elastic connection between the body and them can be used to provide a yielding resistance to the body's rocking. Such a connection is shown in Fig. 3.

The U-shaped spring *n* has one end securely attached to the bent rods *b*, and its free end extending upward and attached to the end of the upper arms. This supplemental spring can also be used in connection with the curved arms *a* to diminish the resistance to the rocking motion of the body.

It may be remarked that instead of the two arms *e* extending on either side of the body, a single arm extending under and pivotally connected to the middle of the body can be used.

In operation the springs in supporting the body and its load are subjected to bending strains throughout the arms *a* and to twisting strains throughout the torsional branches *C*. In yielding to these forces the part of the body to which the arms *a* are attached drops in a slightly-curved path. The lower part of the body to which the arms *e* are attached, being restrained to move in a nearly vertical circular path about the pin *h*, is carried down with the seat, and nearly the same amount. Thus the whole body has a very agreeable up-and-down motion to compensate for the roughness of the road.

The operation of my anti-horse-motion device is as follows: The downward curve in arms *a* permits the part of the body pivotally connected to them to move backward and forward; but the lower part of the body is restrained from a similar motion by arms *e*, the result of which is that the body is permitted to rock about the pivot-pins *h* through a limited arc. The resistance to this rocking motion of the body is provided by the elasticity of the upwardly-extending part of the arms *a*, the bending of which permits the rocking motion. The rate at which the body will rock if set in motion is a function of the stiffness of arms *a* in the parts near their smaller ends, and the stiffness of these parts of the arms is adjusted by giving them the proper dimensions, so that the body will vibrate out of time with the vibrations due to the motion of the horse. Under these conditions the vi-

bratory horse motion, though transmitted to the fixed part of the vehicle, will not be transmitted to the body. By suspending the body on trunnions near the seat the tendency of the body to tip forward or backward when going down or up hill, respectively, is largely avoided.

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

1. In a two-wheeled vehicle, the combination, with the axle, thills attached thereto, one or more cross-bars connecting the thills, and a body, of two arms, the opposite ends of which are securely attached to the body and the fixed parts of the gear, respectively, and which extend nearly or quite longitudinally of the vehicle, the projections of the straight lines drawn between the opposite ends of the same arms upon a longitudinal vehicle-plane being one above the other and extending in nearly horizontal and parallel directions, whereby the combined longitudinal actions of said arms is to provide a resistance to the body's tipping forward and backward while said arms permit the body to move vertically by their angular motions, substantially as described.

2. In a two-wheeled vehicle, the combination, with the axle, the thills rigidly attached thereto, one or more cross-bars connecting the thills, and a body, of a spring securely attached to the thills or cross-bars, and provided with an arm extending backward in a nearly horizontal direction and pivotally connected to the body near the seat, and an arm extending in a nearly horizontal direction and longitudinally of the vehicle and arranged under or in a lower position than said spring-arm, said arm having one end pivotally connected to the fixed parts of the vehicle and the other to the body, substantially as described.

3. In a two-wheeled vehicle, the combination, with the axle, thills, and cross-bar, of springs consisting of torsional branches extending side by side and transversely of the vehicle, said branches being rigidly connected together at one end and provided with arms extending transversely from their other ends, one of said arms being securely attached to the thills or cross-bar and the other extending backward at one side of the body and pivotally connected to the same near the seat, substantially as described.

EVERETT F. MORSE.

Witnesses:

CHAUNCEY P. GREGG,
FRANK L. MORSE.

Correction in Letters Patent No. 432,889.

It is hereby certified that in Letters Patent No. 432,889, granted July 22, 1890, upon the application of Everett F. Morse, of Trumansburg, New York, for an improvement in "Two-Wheeled Vehicles," an error appears in the printed specification requiring the following correction, viz: In line 78, page 2, the compound word "vehicle-plane" should read *vertical plane*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 12th day of August, A. D. 1890.

[SEAL.]

GEO. CHANDLER,

First Assistant Secretary of the Interior.

Countersigned:

ROBERT J. FISHER,

Acting Commissioner of Patents.