

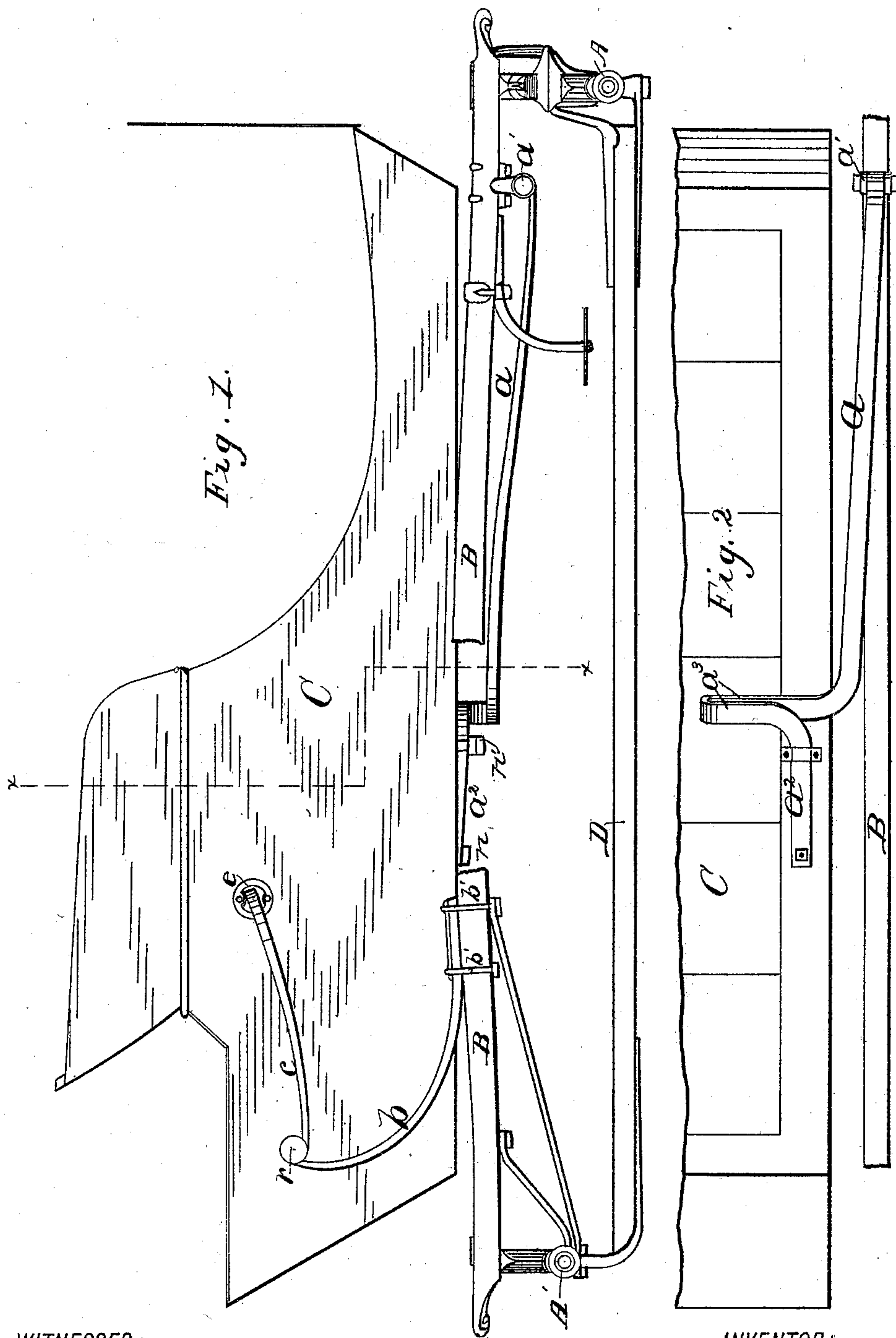
(No Model.)

2 Sheets—Sheet 1.

E. F. MORSE.
VEHICLE SPRING.

No. 505,248.

Patented Sept. 19, 1893.



WITNESSES:

Virgil D. Morse
Frank L. Morse

INVENTOR:

E. F. Morse

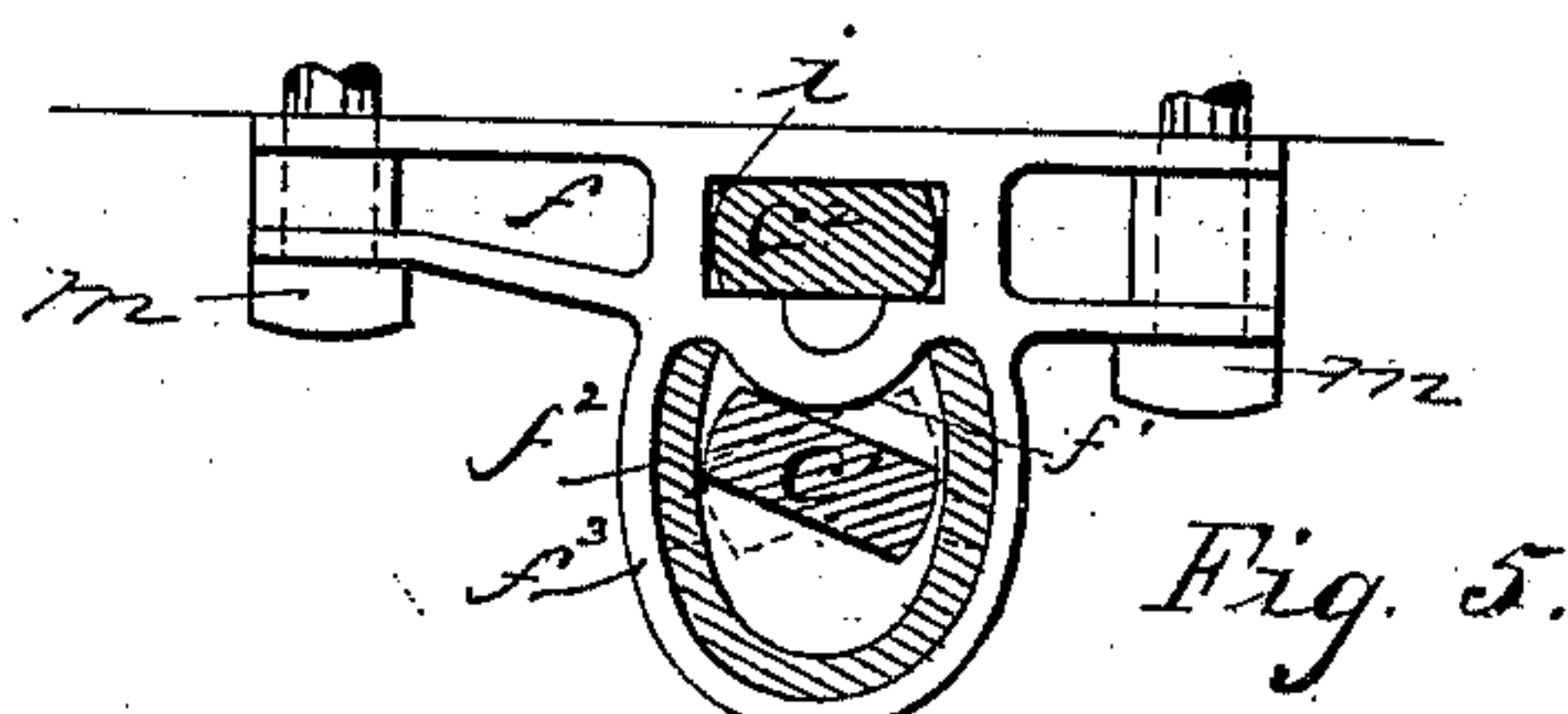
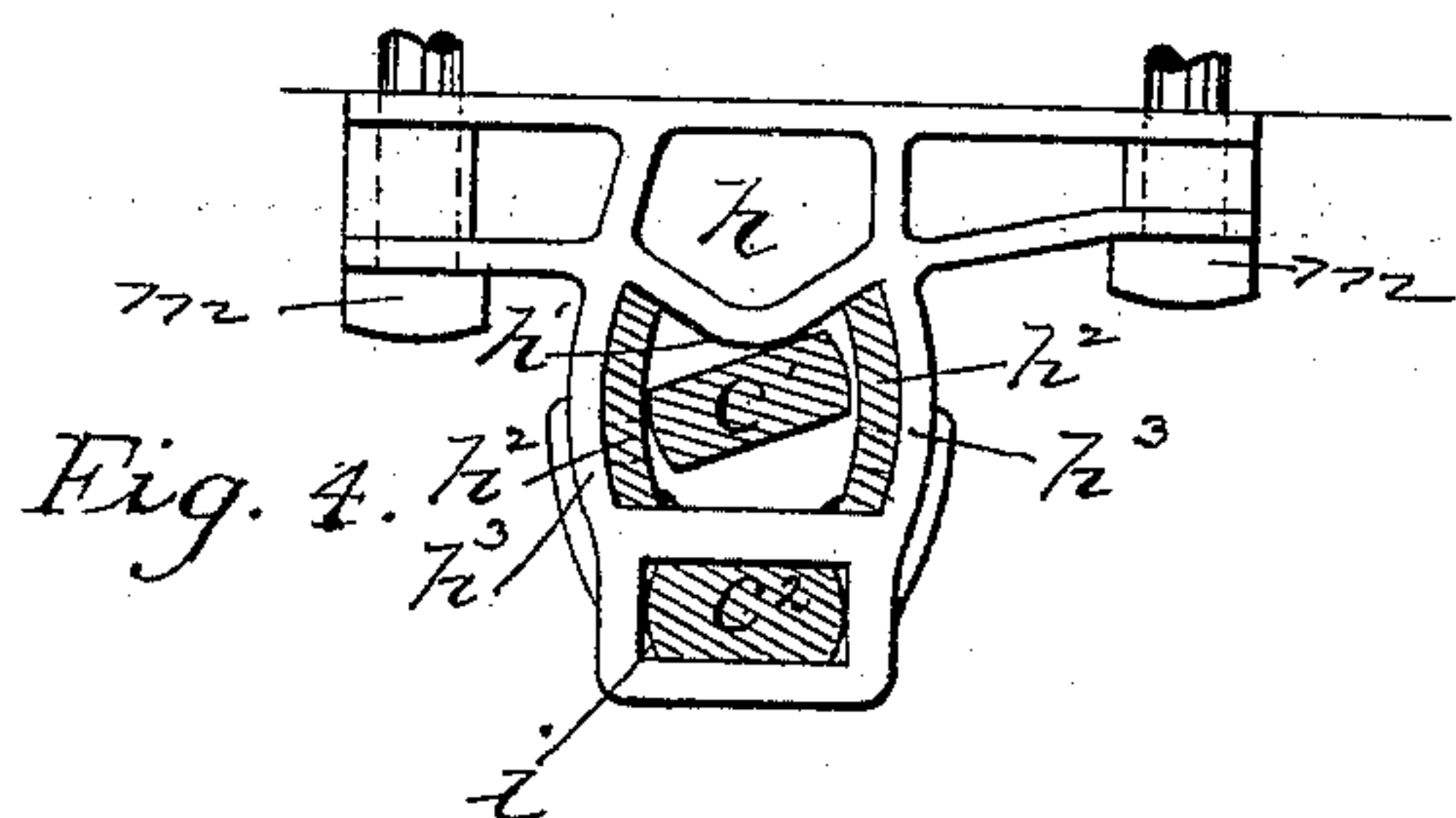
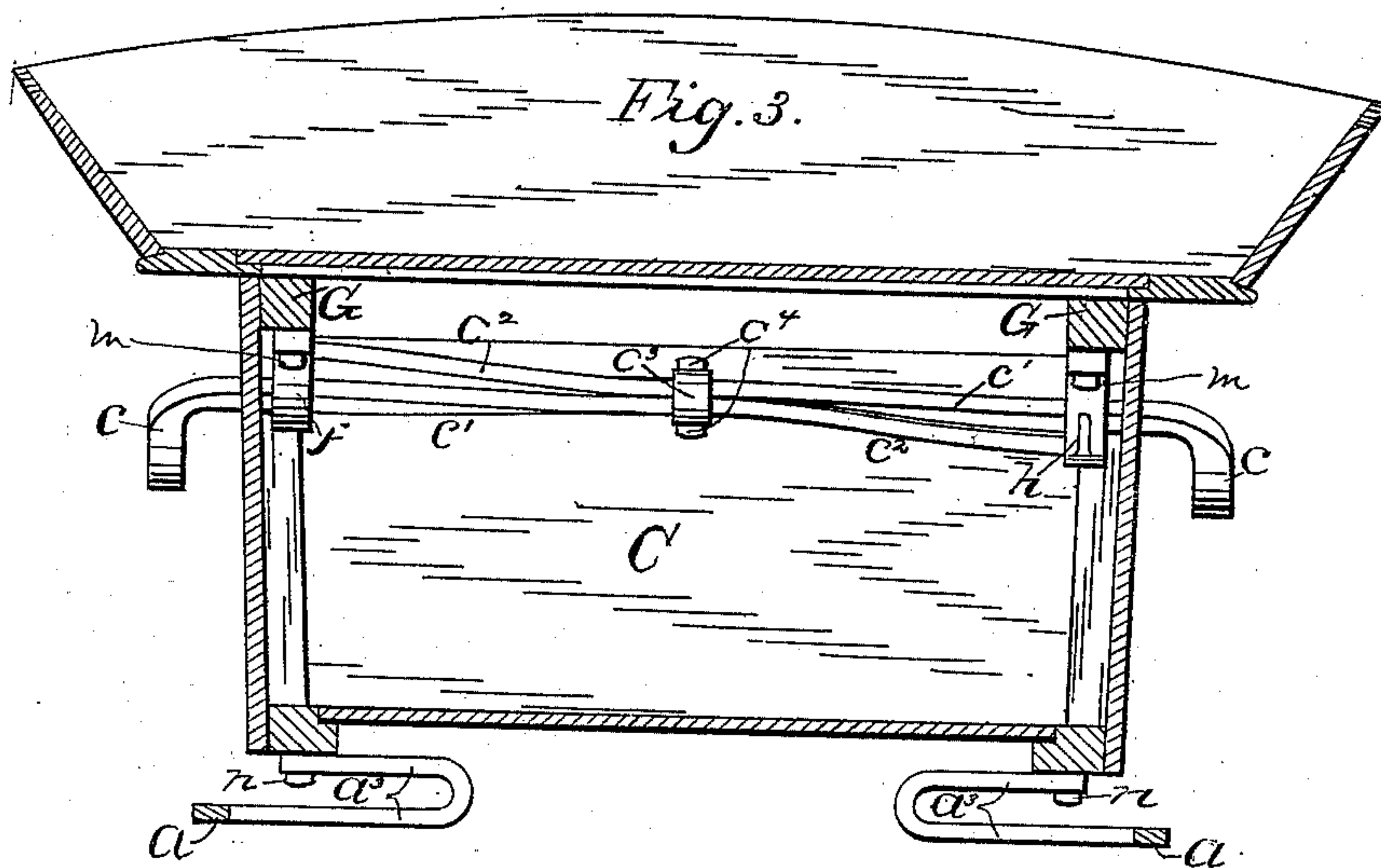
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E. F. MORSE.
VEHICLE SPRING.

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INVENTOR

Love to F. Morse

UNITED STATES PATENT OFFICE.

EVERETT F. MORSE, OF TRUMANSBURG, NEW YORK.

VEHICLE-SPRING.

SPECIFICATION forming part of Letters Patent No. 505,248, dated September 19, 1893.

Application filed February 24, 1892. Serial No. 422,686. (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 Vehicle-Springs, of which the following is a specification.

The principal objects of my invention are to provide springs for four wheeled vehicles of simple construction in which a large portion of the elastic material composing the springs is subjected to torsional strains and which will provide great flexibility to vertical depression combined with the desired stiffness to both sidewise and endwise tipping of the body.

In the accompanying drawings illustrating my invention, Figure 1, is a side elevation of a side-bar vehicle embodying my improvements, having a part of the side bar broken away. Fig. 2, is a bottom view of a part of the same. Fig. 3, is a transverse vertical section on the line X X, Fig. 1. Figs. 4 and 5 are views of the bearings for the upper springs. Similar letters refer to similar parts throughout the several views.

Referring to the drawings, A is the front axle, A', the rear axle, B the side bars, and D the perch all of which may be connected in the usual way.

C is the body hung to the side bars by my springs consisting of the lower springs *a*, the C-springs *b*, and the upper springs *c*. The lower springs consist of the arms *a*², firmly attached to the under side of the body by bolts *n*, and *n*'. The torsional branches *a*³ *a*³, arranged one above the other and extending crosswise of the body and the arm *a*, extending forward from the lower torsion branch, below the side-bar, to which its forward end is attached by shackle *a*'. The C-springs *b*, which are firmly attached to the side bars by clips *b'* *b'*, curve upward and have their free ends provided with ears adapted to receive the eyes of arms *c*, to which they are pivotally connected. The upper springs consist of the arms *c*, arranged on either side of the body, the torsion rods *c'* *c*², extending through the sides of the body and across it to the opposite side where they project into the sockets *i*, (Figs. 4 and 5) of hangers *h* and *f*.

These springs are supported near the arms *c*, and just within the sides of the body by a peculiar form of bearing, a side view of which is shown in Figs. 4 and 5. These hangers are firmly secured to the frame of the body, preferably to the plate beneath the seat by bolts *m m*. The bearing surfaces *h'*, *f'*, of these hangers curve outward, that is, their centers of curvature are on the opposite sides of the bearing surfaces from the torsion bars they support. The flat sides of the substantially rectangular torsion bars bear against the surfaces and rock against them as the arms *c*, are turned. Extending vertically or nearly so from either side of these bearing surfaces, are arms *h*³ and *f*³, and on the inner sides of these arms leathers *h*² and *f*², are fastened. These serve to hold the torsion bars in position under the bearings and form an anti-squeaking surface for the springs to turn against.

While in hanger *h*, the socket for receiving the end of the torsion bar is arranged below the inverted arched bearing *h'*, in hanger *f*, the socket is arranged above the bearing surface, thus permitting the torsion bars to be arranged one above the other and clamped together at their middle point by clamp *c*³.

A neat escutcheon *e*, protects the body where the springs pass through its sides.

The yielding of the torsion branches of the upper and lower spring under loading, permits the arms *a* and *c*, to which they are attached, to turn through a limited angle about their respective torsion branches and the parts of the body to which these arms are attached, to be depressed along substantially vertical paths thus causing the body to move up and down in a very even and pleasant manner to compensate for rough roads.

The objectionable freedom of most side-bar springs to both rolling and pitching, is avoided in these springs, first, by additional resistance to side rocking due to the arrangement of the springs *c*, above the springs *a*, second, by the equalizing action of the torsion springs *c'* *c*², due to their being clamped together in the middle, thus causing the portions *c*², of these torsion rods extending from the clamp *c*³, into the sockets *i*, of the hangers *f*, and *h*, to yield angular motion alike to

both arms c c , on opposite sides of the body, and third, by the suspension of the body from high supports attained by the arrangement of the upper springs.

5 Among the advantages of the hangers Figs. 4 and 5, are simplicity, cheapness and the nicety with which it works. It requires no change of form in the spring bars and, as the bar turns against it, there is a very small
10 amount of slipping for the maximum angular motion of the bars. Evidently the curvature of this bearing may be made either greater or smaller than that shown, as will best serve the purpose in the particular case to which
15 it is adapted.

I claim under separate application, Serial No. 422,794, filed February 24, 1892, somewhat similar springs as applied to two wheeled vehicles, to which reference may be made.

20 What I claim as new is—

1. In a vehicle, the combination with the body, of a spring consisting of a torsion rod extending through the sides of the body, crosswise within the same and securely attached
25 to the framework thereof,—and an arm rigidly attached to said torsion bar, arranged outside of the body, alongside thereof—and supported at its free end by the gear, substantially as described.

30 2. In a vehicle, the combination with the body, of springs consisting of arms arranged outside of and along either side of the body, torsion bars extending crosswise of the body within the same, said torsion bars being arranged one above the other, clamped together
35 at their middle and having their ends projecting into sockets of hangers firmly bolted to the body frame, substantially as described.

40 3. The combination with the body and side-bars of a vehicle, of the C-springs b , the torsion springs c — c' — c^2 , having the arms c , arranged without, and the torsion branches c' c^2 , within the body, substantially as described.

4. In a vehicle the combination with the body of two springs arranged, one above, or
45 in a higher position than the other, the one attached to the bottom of the body, arranged lengthwise of the same and supported by the gear, the other attached to the side of the body extending alongside of the same and supported
50 by the gear, substantially as described.

5. The combination with a torsion spring of a hanger having an outwardly curved bearing surface, a substantially rectangular torsion bar arranged against said surface and adapted
55 to rock about the same, arms projecting from the hanger on either side of said torsion bar, substantially as and for the purpose described.

6. The combination with a torsion spring of hangers having an outwardly curved bearing
60 surface, a substantially rectangular torsion bar arranged against said surface and adapted to rock about the same, arms projecting from the hangers on either side of said torsion bar, leathers attached to the inner side of these
65 arms, substantially as described.

7. The combination with two torsion springs each provided with supporting arms and torsion rods, said rods being arranged one above the other and clamped together, of two hang-
70 ers, each of which is provided with an outwardly curved bearing surface for one spring to turn against and a socket to receive the end of the other spring, the sockets in the different hangers being arranged one above
75 and the other below said bearing surface, substantially as described.

EVERETT F. MORSE.

Witnesses:

C. P. GREGG,
V. D. MORSE.