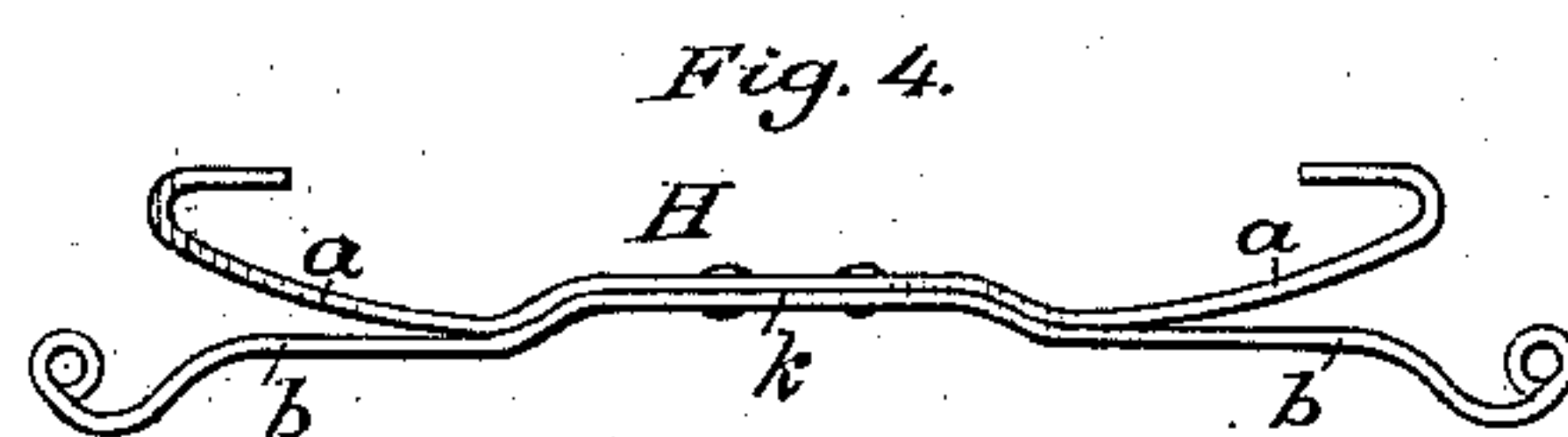
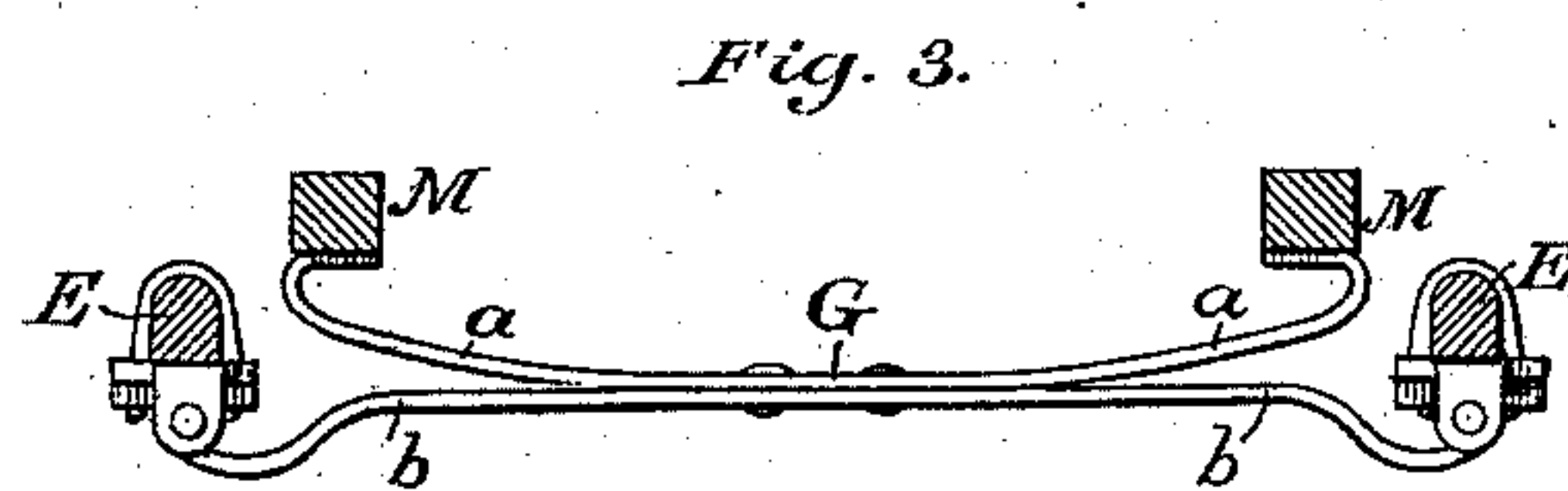
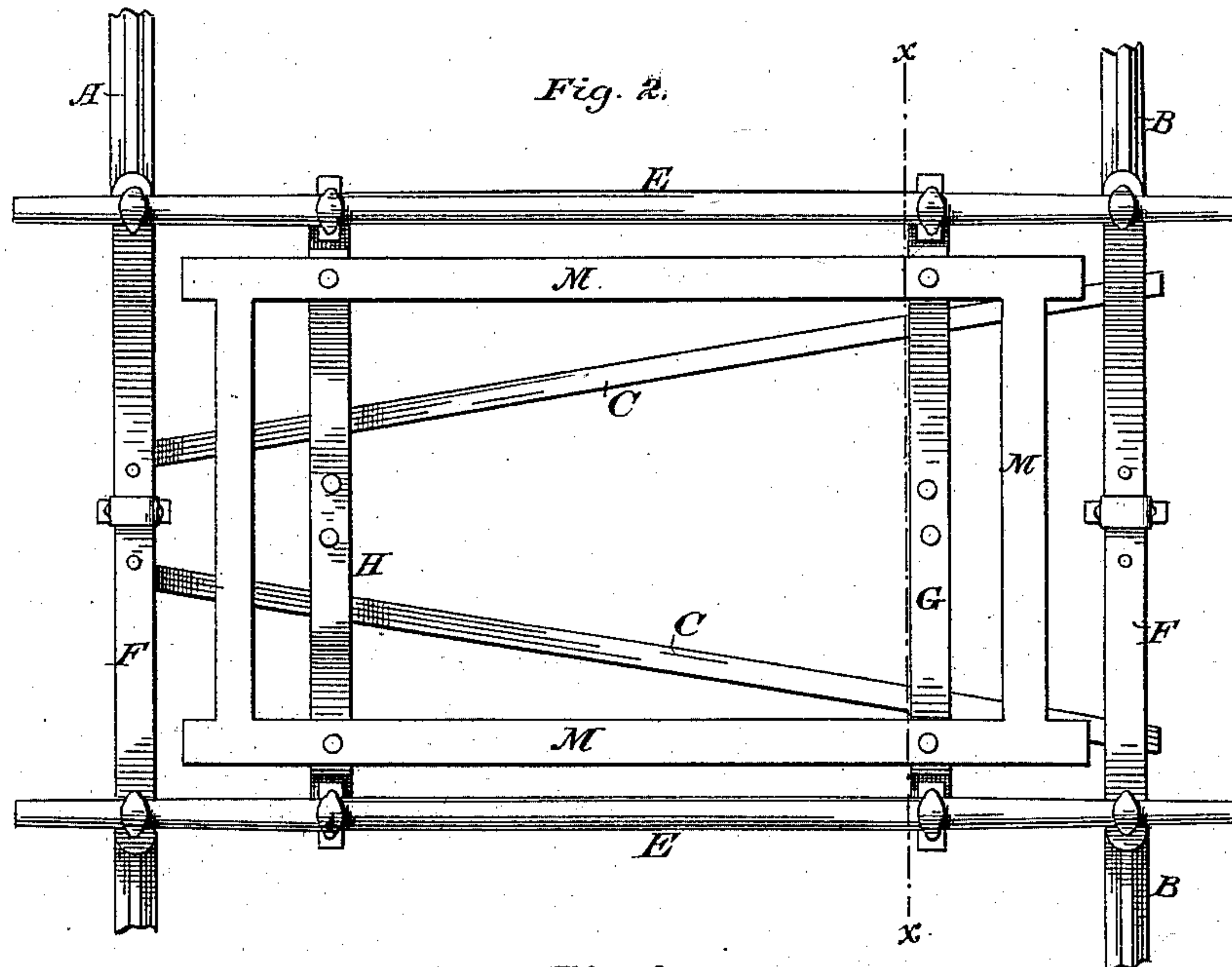
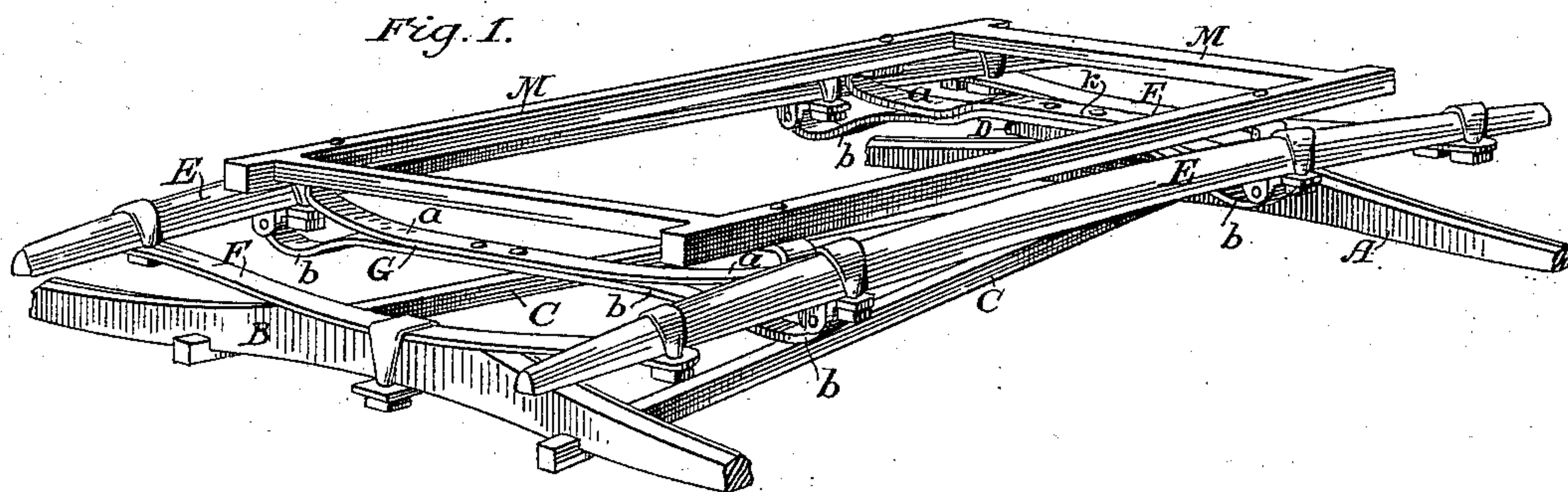


S. A. BAILEY.  
Vehicle-Spring.

No. 224,627.

Patented Feb. 17, 1880.



Witnesses:

C. Clarence Poole  
D. P. Lowe

Inventor:

S. A. Bailey,  
By J. B. Jones  
his attorney.



# UNITED STATES PATENT OFFICE.

SELDEN A. BAILEY, OF WOONSOCKET, RHODE ISLAND.

## VEHICLE-SPRING.

SPECIFICATION forming part of Letters Patent No. 224,627, dated February 17, 1880.

Application filed December 13, 1879.

*To all whom it may concern:*

Be it known that I, SELDEN A. BAILEY, of Woonsocket, Providence Plantations, and State of Rhode Island, have invented certain new and useful Improvements in Vehicle-Springs; and I do hereby 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 appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The invention relates to side-bar vehicles; and it consists in certain improvements in the cross-springs supporting the vehicle-body between the side bars. The semi-elliptic spring is the spring usually adopted for this purpose, in which case the body is attached at its center to the spring, and when the vehicle is unevenly loaded or traveling on laterally-inclined ground the body is apt to lop down on one side. Moreover, said springs lengthen and shorten as the body rises and falls, creating a lateral strain upon the side bars.

The object of this invention is to avoid the difficulties above mentioned, and to provide a spring for side-bar vehicles of but few parts and of small initial cost, which will have a wider capacity alike for light and heavy loads, which will graduate itself to the varying pressures brought upon it, and which will afford other advantages hereinafter specified.

The invention consists, principally, in a duplex cross-spring composed of a downwardly-bowed metallic spring or spring-bar, having its ends attached to the vehicle-body and a horizontal metallic spring having its ends curved and attached to the side bars, the two parts being united at their centers and divergent toward their ends, and adapted to lap upon and re-enforce each other as the weight is increased.

In the drawings, Figure 1 is a perspective view, looking from the rear, of a portion of the running-gear of a carriage, including the side bars and this improved cross-spring. Fig. 2 is a plan of the same with the ends reversed. Fig. 3 is a transverse section on line *xx* of Fig. 2, clearly showing this improved spring as shaped for a hind cross-spring. Fig. 4 is

a longitudinal elevation of this improved spring as shaped for a fore cross-spring.

The fore axle, A, and hind axle, B, are connected together by means of the reaches C C and a bolster, D, in the usual manner. The side bars, E E, are supported, in the usual manner, near their ends, by means of half-elliptic springs F F, which rest upon and are clipped to the hind axle and bolster, respectively.

The hind cross-spring, G, is composed of two single leaves of spring-steel united at their centers and divergent toward their ends. The ends of the upper leaf, *a*, are bent upward and inward and attached to the sides of the carriage-body. The ends of the lower leaf, *b*, are clipped to the side bars. The upper leaf is bowed downward toward the center. The lower leaf is straight or horizontal for the greater and central portion of its length, and curves downward somewhat abruptly near its ends. The two parts are riveted or otherwise fastened together centrally of their length.

The upper leaf, which forms or serves as a spring-bar, is so shaped and fastened to the body as to be comparatively rigid, while the lower leaf, which constitutes the main leaf, and contributes the greater portion of the elasticity contained in the spring, is compelled to conform nearly to the original shape of the upper leaf as the parts are forced in contact. As the upper leaf sinks upon the lower leaf the straight central portion of the lower leaf becomes curved, and the curved end portions are straightened. The bending of the straight portion has a tendency to bring the ends nearer together, and hence practically to shorten the spring; but this tendency is offset by the straightening of the curved portions, which has a tendency to lengthen the spring. Hence, owing to its peculiar shape, this spring preserves a uniform length under varying pressures, and no lateral strain or twist is brought upon the side bars, as is the case with semi-elliptic or torsion springs.

The fore cross-spring, H, is constructed upon similar principles to the hind cross-spring, G, but is provided with an elevated central portion or bridge, K, formed by swaging up both the upper and under plates. Both parts of the spring lap close upon each other throughout the length of the bridge, and only begin



to diverge upon either side thereof. The effect of the bridge is to stiffen the spring somewhat and secure a more even carriage of the vehicle-body. This spring operates upon the same principle as spring G, the parts closing upon each other from the ends of the bridge outward as weight is put upon it.

It is desirable to hang the body as low as possible, and at the same time to avoid contact of the springs with the reaches. Two reaches are commonly employed in this class of vehicles. Under the hind spring these reaches are wide apart, and the central portion of the spring, as it is depressed by the weight upon it, may sink between them; but under the fore spring the reaches are near together, and to enable the spring to suffer depression and escape contact therewith said spring is provided with the elevated bridge K, before described.

As the parts of this improved spring lap together its strength and stiffness are increased, and it thus graduates itself to the varying pressures of light and heavy loads. The parts are not liable to break or be overstrained, each is so intimately supported by the other.

The degree of elasticity may be varied by varying the degree of curvature of the upper leaf. When the parts are so shaped and adjusted as to leave long open spaces between them the spring will be very highly elastic. When the parts are so shaped and put together as to leave short open spaces between them the spring will be quite stiff. Thus a spring of any description may be readily formed from these same two parts.

What is claimed as the invention is—

1. The combination, with the side bars and the vehicle-body, of a spring composed of two parts or plates united in the center and divergent toward the ends, and adapted to lap together from at or near the center toward the ends as the pressure is increased, substantially as described.

2. The combination, with the side bars and the vehicle-body, of a duplex cross-spring, one part of which is straight for a portion of its length and curved the remainder thereof, and so arranged in conjunction with the other part as to shorten in one portion and lengthen in the others, substantially as described.

3. The combination, with the side bars and the vehicle-body, of a duplex spring, one part of which is adapted to shorten in one portion and lengthen in others as pressure is brought upon it, whereby its length remains permanent, or nearly so, under varying pressures, substantially as described.

4. The combination, with the side bars, their supporting-springs, and the vehicle-body, of a cross-spring composed of two plates united at their centers and divergent toward their ends, and having their central portions swaged up, forming a bridge, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand and seal this 11th day of December, 1879.

SELDEN A. BAILEY. [L. S.]

Witnesses:

IRA COPELAND,  
CHARLES W. SUMNER.