2 Sheets—Sheet 1.

# J. D. SARVEN.

## Carriage-Spring.

No. 202,965. Patented April 30, 1878.

FIG. 1.

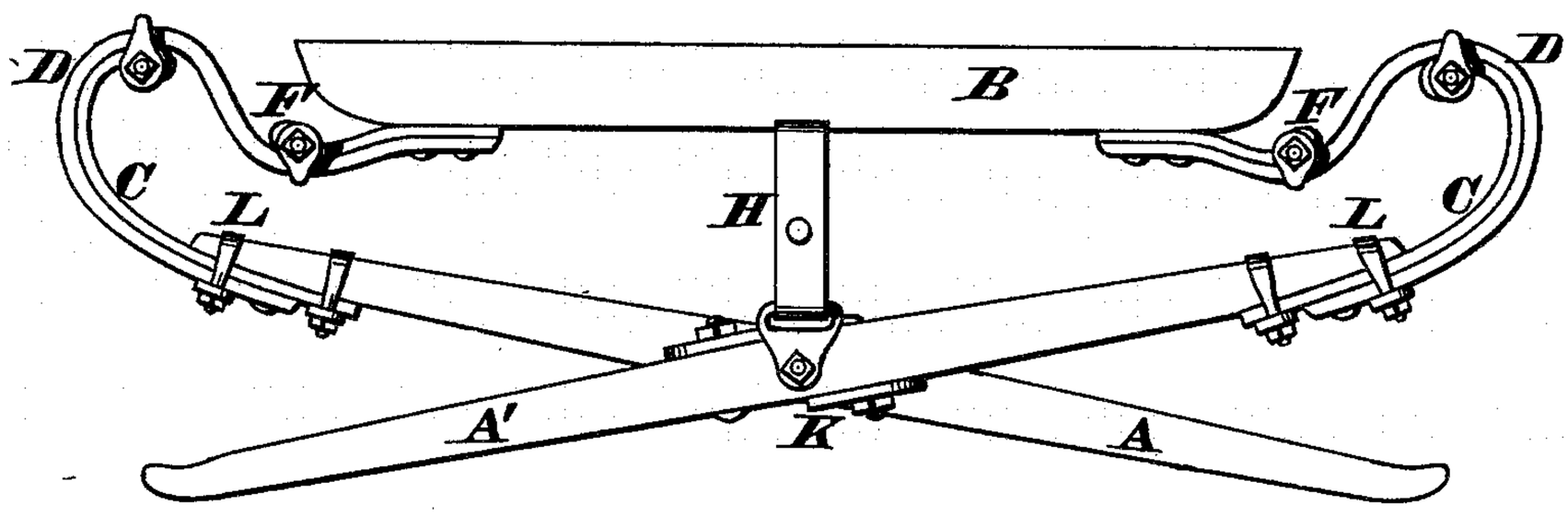



FIG. 2.

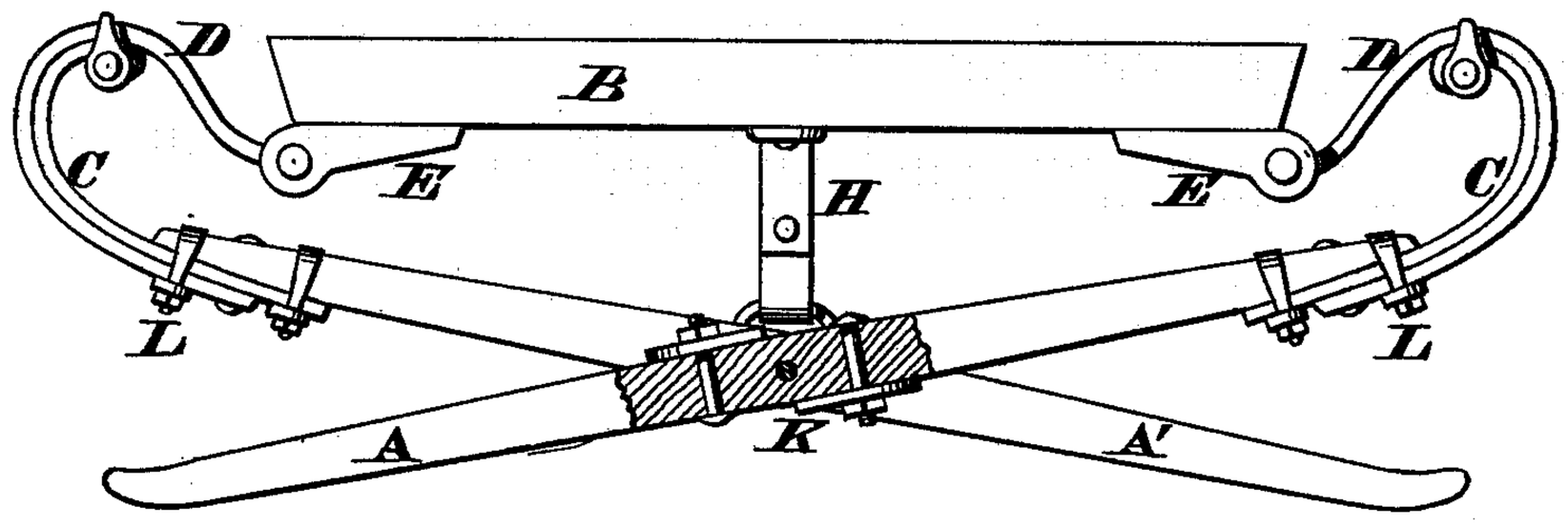



FIG. 3.

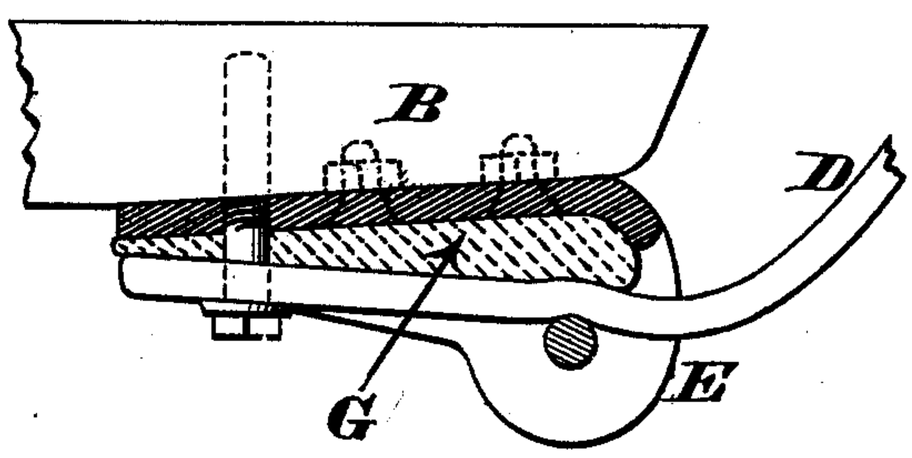
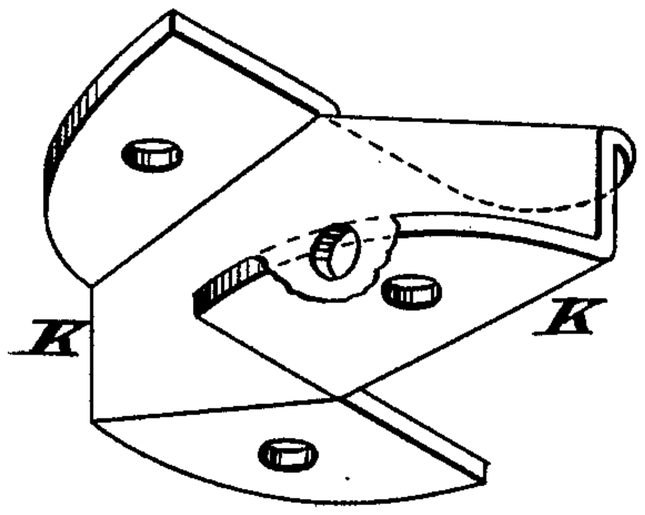



FIG. 4.




Attest.
P. H. Sutherland
Arthur Stern

Inventor.
Jas D Sarven

2 Sheets—Sheet 2.

# J. D. SARVEN.
## Carriage-Spring.

**No. 202,965.** **Patented April 30, 1878.**

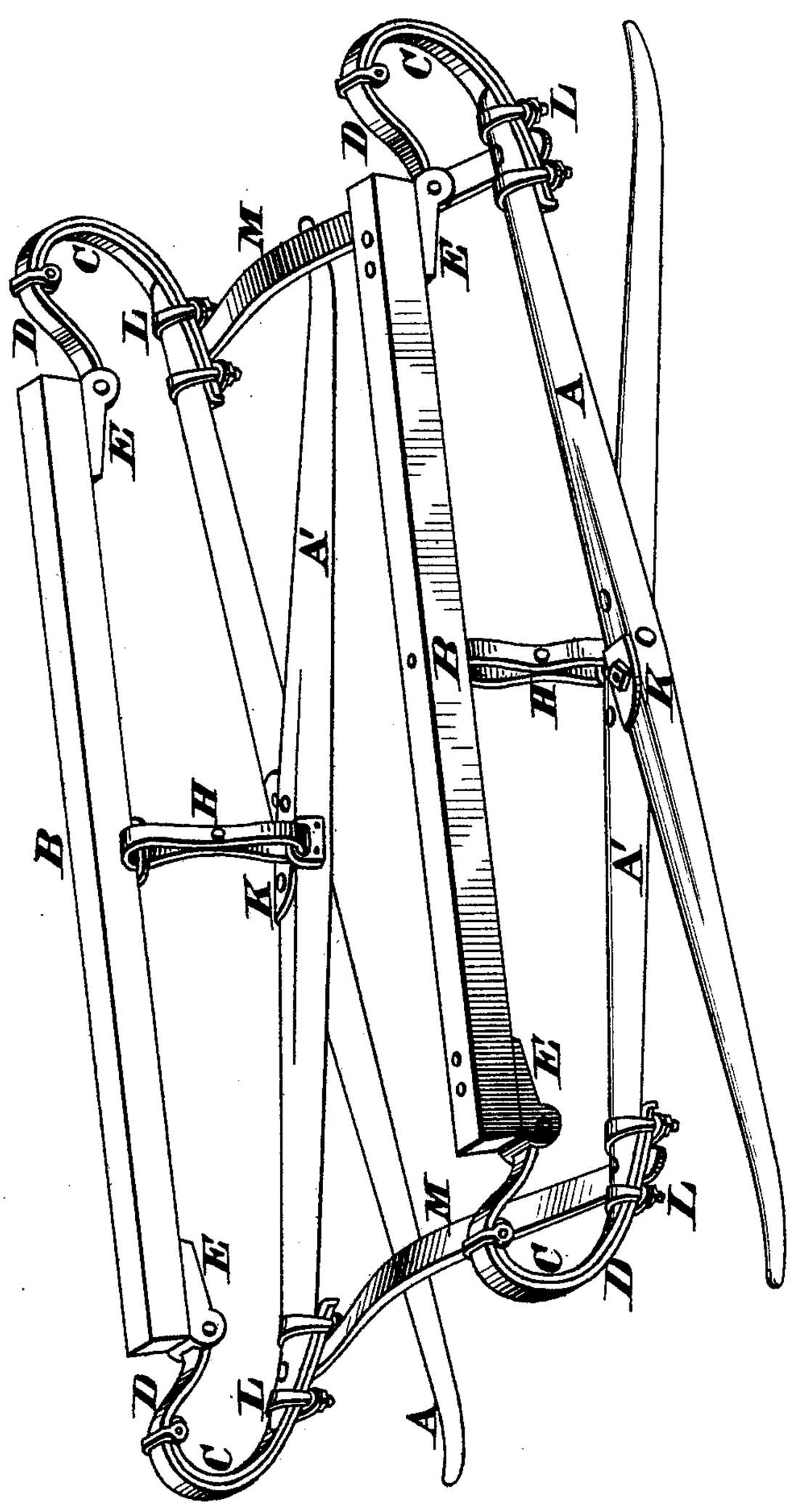



FIG. 5.

Attest.
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Inventor.
Jno D Sarven

# UNITED STATES PATENT OFFICE.

JAMES D. SARVEN, OF COLUMBIA, TENNESSEE.

## IMPROVEMENT IN CARRIAGE-SPRINGS.

Specification forming part of Letters Patent No. **202,965,** dated April 30, 1878; application filed January 28, 1878.

*To all whom it may concern:*

Be it known that I, JAMES D. SARVEN, of Columbia, Tennessee, have invented an Improvement in Carriage-Springs, of which the following is a specification:

This invention relates particularly to improvements in X-shaped springs for vehicles when combined with C-shaped springs and proper connectors.

It consists, more especially, in the use of leather or other elastic connectors and additional springs, or india-rubber or other elastic material, by means of which a yielding and elastic, instead of a firm, rigid, connection is formed between the running-gear and the body of the vehicle, thereby preventing any sudden jar from being communicated to the body of the vehicle; and also in a binder-spring, for supporting the X-springs against lateral movement.

In the drawings, Figure 1 is a side elevation of my improved form of spring, showing the additional spring. The leather is used to form a connection between the parts. Fig. 2 is a side elevation, showing clips or ears, in which may be embedded rubber or other elastic material, with part in section. Fig. 3 is an elevated vertical section through the clip or ear attachment, (shown in Fig. 2,) and illustrating more particularly a method of applying the rubber. Fig. 4 is a perspective view of the flange-plate wherewith the spring-bars are coupled to each other. Fig. 5 is a perspective view, showing the two X-springs on opposite sides of carriage, connected by binder-springs at front and rear.

To enable a mechanic more readily to construct my invention, I will describe it more particularly.

A A′ in the drawings represent the X-shaped springs for vehicles, secured together at the point of crossing by the flanged plates K, ordinarily employed. C C represent the C-springs, secured to the ends of the cross-springs in the ordinary manner. D D represent the ordinary leather attachments, passing over the outside of the C-springs, and attached to the C-springs and X-springs by clips or other means, the other ends being attached to the body of the vehicle, at or near its corners, by extending under the springs, intended to give additional elasticity. E E, Fig. 2, represent ears or clips, in which are embedded rubber or other elastic material. G, Fig. 3, represents the piece of rubber under which the leather connector passes, and shows the method by which it is secured in the clip or ear E, and the method of attaching it to the body of the vehicle B.

Any elastic material may be used instead of india-rubber; or, if it is preferred, the form shown in Fig. 1 may be used, where I have shown, instead of the rubber G and clip or ear E, springs F F, secured to the body of the vehicle. This is a short spring, of steel or other appropriate material, underneath which passes the leather connector. These connections of rubber, or by means of the short springs F F, give an easy and yielding motion to the body of the vehicle, and the ear-plates prevent too much side motion.

If preferred, the ear-plates may be welded to the iron that extends under the body of the vehicle; or they may be made of malleable cast-iron.

In order to prevent too much side motion of the X-springs and to afford them mutual support, I usually attach light binder-springs M M to or near the clips L L, at the ends of the X-springs, these binder-springs extending across to the X-springs on the opposite side of the vehicle. Their ends may form the clip-couplings under the leather connectors, being perforated to receive the ends of clips. For a light vehicle these springs are usually made about one-eighth of an inch thick and three-quarters of an inch wide.

I have employed X-springs and C-shaped springs, in combination with leather connectors, connecting the end of the C-shaped springs with the carriage-body, as described in my patent granted July 27, 1875, No. 165,956.

By experience, I have found a practical difficulty arising out of the use of the combination there described, as, the leather connector being attached directly to the end of the C-spring, and connecting it in that manner to the carriage-body, a sudden jolt, caused by running over an obstruction, will sometimes result in breaking the C-spring, by reason of the strain being applied at a single point at the end of the spring. In this application I remedy that de-

fect by passing the leather connector over the outside of the C-shaped spring and thence to the carriage-body, thereby supporting the C-spring throughout its entire length.

What I claim as my invention is—

1. In combination with X-springs and C-shaped springs, leather connectors passing over the outside of the C-springs, substantially as and for the purposes set forth.

2. In combination with a vehicle employing X-springs and C-springs combined, the short steel springs F attached to the under side of the carriage-body, so as to furnish a yielding action of the body with the springs, substantially as and for the purposes described.

3. The combination of the X-springs, the C-shaped springs, the leather connectors D D, and the short springs F F, as and for the purposes described.

4. In a vehicle employing X-springs and C-shaped springs, leather connectors passing outside the C-springs, and having a yielding connection with the carriage-body.

5. The binder-springs M M, in combination with the X-springs, substantially as and for the purposes described.

JAS. D. SARVEN.

Witnesses:

R. W. H. PARKINSON,

ARTHUR STERN.