J. CUNNINGHAM.

Carriage-Spring.

No. 167,991. Patented Sept. 21, 1875.

Fig. 1.

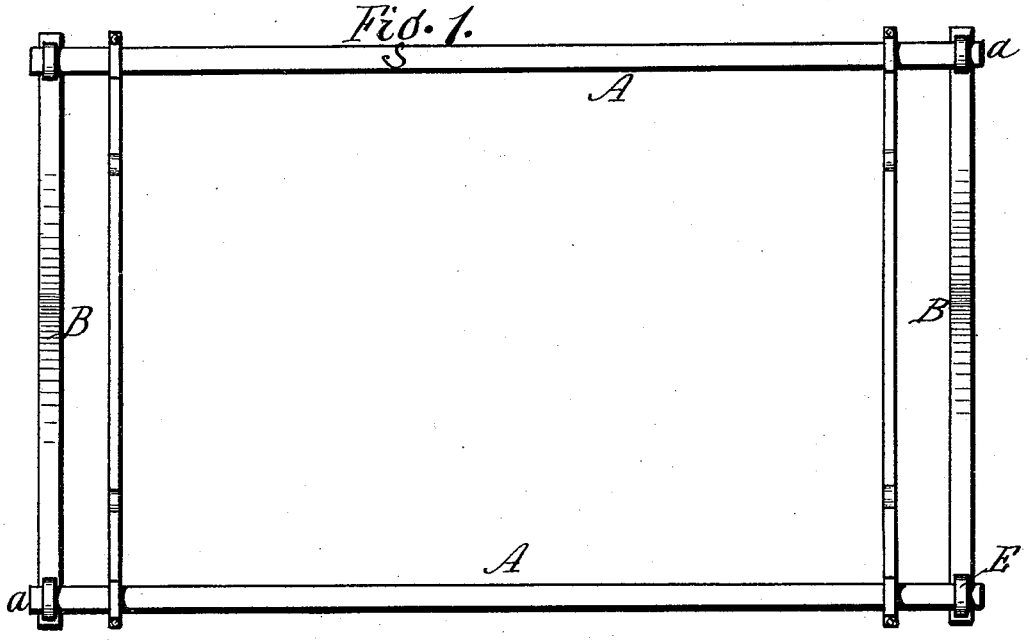


Fig. 2.

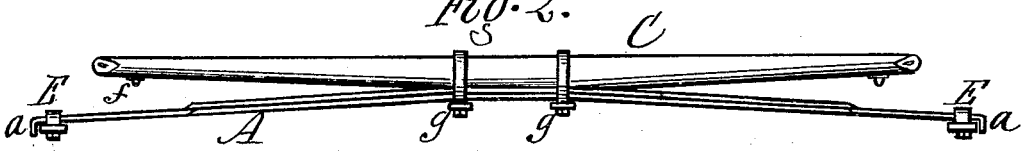


Fig. 3.

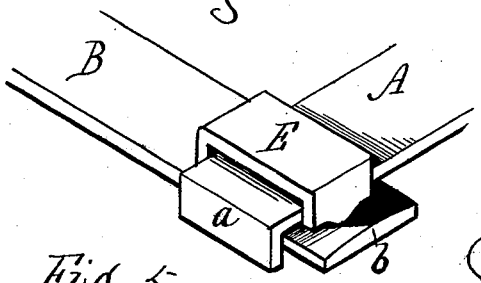


Fig. 4.

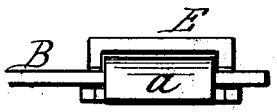


Fig. 5.

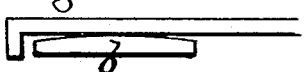
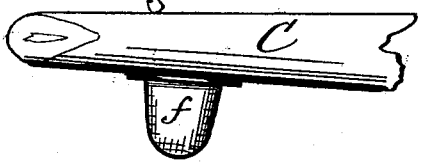


Fig. 6.



Witnesses.
E. B. Scott.
Louis Spahn.

Inventor.
James Cunningham,
per R. F. Osgood,
Atty.

UNITED STATES PATENT OFFICE.

JAMES CUNNINGHAM, OF ROCHESTER, NEW YORK.

IMPROVEMENT IN CARRIAGE-SPRINGS.

Specification forming part of Letters Patent No. **167,991**, dated September 21, 1875; application filed August 30, 1875.

To all whom it may concern:

Be it known that I, JAMES CUNNINGHAM, of the city of Rochester, in the county of Monroe and State of New York, have invented a certain new and useful Improvement in Carriage-Springs; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a plan of the springs, with the carriage-body and side bars removed from place. Fig. 2 is a side elevation, showing the spring attached to the side bar. Figs. 3, 4, 5, and 6 are detail views.

My improvement relates to side-bar carriages in which side springs and cross-springs, united at their corners, are used to support the carriage-body. The invention consists of a peculiar corner-connection for said springs, as hereinafter described.

A A are the side springs, and B B are the cross-springs. These are flat springs made of steel, and re-enforced by one or more leaves, if desired, to give proper strength. They are connected at the corners so as to form a rectangular spring-frame, as shown in Fig. 1, which supports the carriage-body. C C are the side bars, of which one is used on each side, secured on top the center of the side spring by clips *g g*, or other suitable connections, as shown in Fig. 2. This is the usual arrangement in carriages of this class. In order to allow proper end play of the side springs on the end springs as they are depressed, I employ a peculiar corner-connection, as follows: The ends of the side springs, after they cross the end springs, are bent down at right angles, as shown at *a a*, thereby forming stops, which prevent the side springs from being drawn back over the end springs when the side springs react. That portion of the end springs on which the side springs rest is made convex or rounding in cross-section, as shown at *b* in Figs. 3 and 5, so that, as the side springs rise or fall, they rock upon the curved surfaces *b*, thereby giving easy motion, preventing binding, and obviating wear and twisting of the end spring where the side spring comes. The ends of the springs thus crossing are secured by a flat clip, E, or equivalent, which embraces the side spring, but allows it to move freely, and is bolted fast to the end spring, as clearly shown in Figs. 3 and 4. This flat clip, while it allows the necessary end motion of the side spring in rising and falling, presents such a broad bearing-surface to the side spring that the latter cannot twist, "shuck," or otherwise become displaced.

The special advantage in this corner-coupling consists in the bent ends *a* of the side springs, the convex surface *b* of the end springs, and the flat clip or equivalent fastening E, whereby the parts are retained in place, but still allowed free movement. By this means a stop or fastening to prevent the withdrawal of the side springs is produced by the simple bending of the spring itself; a self-adjusting rocking surface is also produced, which prevents wear and strain, and the whole is retained in true position by the clip fastening without danger of detachment. The device is simple, cheap, and effective. In ordinary springs of this kind the corners of the springs are bolted or riveted through, which causes twisting and strain, and prevents the proper play of the springs. The side bars C C have at each end, on the under side, a nipple or block, *f*, of rubber, or equivalent material, which forms a bumper to prevent striking of the clips that secure the body-loops upon the side spring. These blocks break all shocks.

Having thus described my invention, what I claim as new is—

The combination, with the side spring A and cross-spring B, of the bent end *a* of the side spring, the curved bearing *b* of the cross-spring, and the clip E, securing the said parts together, the whole arranged to operate in the manner and for the purpose specified.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JAMES CUNNINGHAM.

Witnesses:

AUGUSTUS FRENCH,

JEREMIAH GOODSPEED.