J. T. PICKHAVER.
Carriage Spring.

No. 196,382. Patented Oct. 23, 1877.

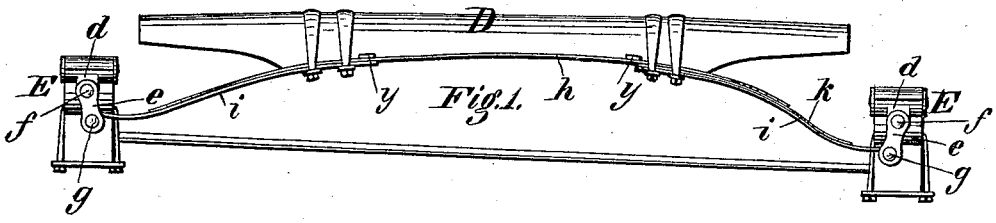

Fig. 1.

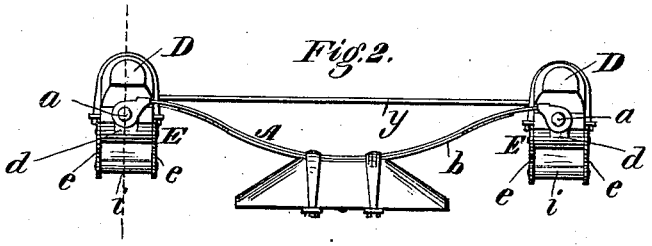

Fig. 2.

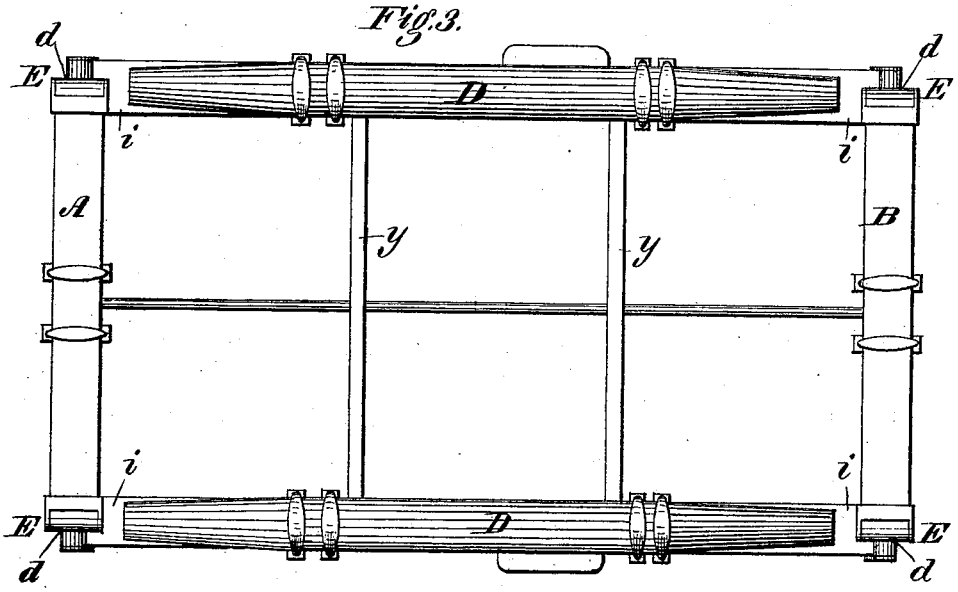

Fig. 3.

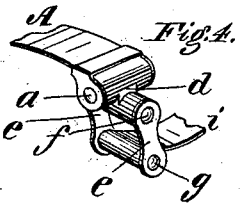

Fig. 4.

Witnesses:
Donn J. Twitchell.
D. P. Cook

Inventor:
J. T. Pickhaver
By his attys.
Dodgeson.

UNITED STATES PATENT OFFICE.

JOHN T. PICKHAVER, OF IONIA, MICHIGAN.

IMPROVEMENT IN CARRIAGE-SPRINGS.

Specification forming part of Letters Patent No. **196,382**, dated October 23, 1877; application filed August 4, 1877.

To all whom it may concern:

Be it known that I, JOHN T. PICKHAVER, of Ionia, in the county of Ionia and State of Michigan, have invented certain Improvements in Carriage-Springs, of which the following is a specification:

My invention consists in certain improvements in that well-known system of springs composed of two side-bar springs, connected at their ends to the ends of transverse springs, mounted above the axles, the improvements being designed mainly to render the action of the springs easier, and to overcome the torsional strain to which they are ordinarily subjected.

Figure 1 represents a side elevation of my invention; Fig. 2, an end view of the same; Fig. 3, a top-plan view of the same; Fig. 4, a perspective view of one of the couplings uniting the side and end springs.

A and B represent the two transverse semi-elliptic springs, seated firmly on head-blocks or bolsters; and C, the two longitudinal side springs, secured to the under side of the spars or side bars D, and suspended at their ends by couplings E from the ends of the transverse springs, as shown.

The end springs A B have their ends curved slightly downward, and provided with depending side ears to receive a coupling-pin, *a*, which latter should stand but slightly above the level of the middle of the spring, and the pillow-blocks are made, as shown, comparatively short, in order to leave the vibrating end of the spring as long as possible. By thus forming and arranging the springs their ends are caused to move in an arc of great radius, and to rise and fall in a practically vertical line, so that they have no tendency to move the side springs laterally or twist the same, as is generally the case.

The springs A B are each made in one piece from end to end, and each supported and stiffened by an additional leaf, *b*, seated under and extending nearly its entire length.

Each coupling consists of a pivoted block, *d*, and two pendent links, *e*. A bolt, *a*, passing through the upper part of the block *d* transversely across the end spring, connects the block thereto, while a second bolt, *f*, passing through the lower part of the block at right angles to the upper bolt, sustains the upper ends of the links *e*, which have their lower ends mounted on the ends of a bolt, *g*, passed transversely through an eye on the end of the side springs, as shown. This arrangement admits of the side springs playing up and down, and of their being elongated by the effect of weight upon them without their having any tendency to twist the end springs or move them laterally, and also, in like manner, admits of the end springs playing freely without twisting or displacing the side springs, each spring being permitted to play freely, and to remain in its proper vertical position under all circumstances, while at the same time the springs are enabled to work in unison with an easy gentle motion, and without cramping or binding.

The arrangement of the springs so that they have no tendency to twist or displace each other is of great importance, inasmuch as it greatly increases the elasticity and easiness of action, and avoids the displacement and twisting of the springs and the general racking and loosening of the parts so common under the ordinary arrangements of springs.

The side springs consist of a long top leaf or spring, *h*, lying next to, and extending the entire length of, the spar, and terminating at a greater or less distance from the couplings, and of a bottom leaf, *i*, connected to the coupling, and extending inward a short distance under the top leaf and the bar, and secured firmly thereto by clips, as shown, one or more intermediate stiffening-leaves, *k*, being used when desired.

By arranging the short springs or leaves under the upper one, and extending them beyond the same, I am enabled to build up a cheap spring of any required stiffness without the use of the main spring of full length, and without cutting and weakening the spar.

In order to give the system additional stability I extend two metal bars, *y*, from one side bar to the other near their ends, and fasten them securely under the bars by clips, the bars thus applied serving to retain the side bars in parallel lines, and to keep them from twisting or turning over sidewise.

In practice, I find that by making the coupling-blocks of brass they operate in connection

with the steel springs in an easy and noiseless manner, so that the creaking and harsh grating sounds usually incident to this class of springs are entirely avoided.

I am aware that the combination of side springs and transverse springs connected at their ends is old, that couplings of various kinds have been used to connect springs with each other, and that side springs extending from one end spring to the other have been used with leaves bearing upon them, and I make no claim thereto; but,

Having described my invention, what I do claim is—

1. In combination with the two transverse end springs, constructed and arranged so that their ends rise and fall in practically vertical lines, the two longitudinal side springs and the couplings between the side and end springs, each consisting of but three pieces, *d e e*, and their connecting-bolts, all constructed and arranged as shown and described.

2. The combination of the spar D, the long steel spring *h*, seated under and extending beyond the ends of the spar, and the short leaf-springs *i*, seated under and extending beyond the spring *h*, and secured thereto and to the spar, as shown.

JOHN T. PICKHAVER.

Witnesses:

C. O. THOMPSON,

J. D. WELCH.