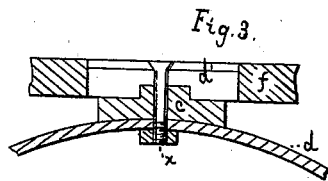
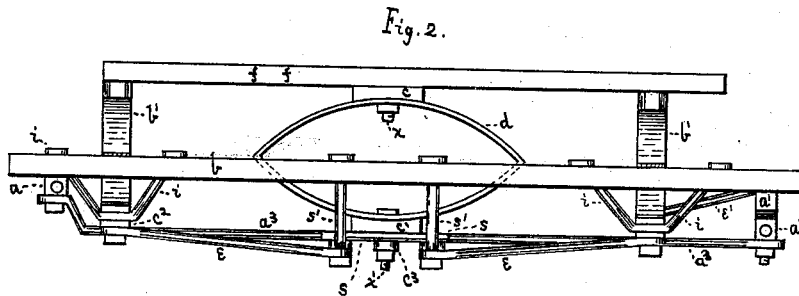
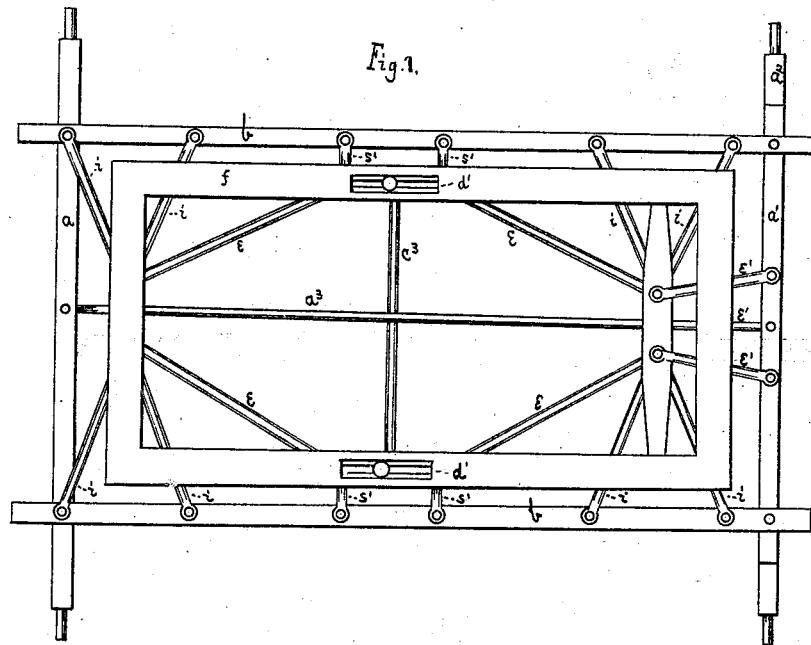


J. J. KRAISS.  
Spring-Vehicle.

No. 221,173.

Patented Nov. 4, 1879.



Witnesses  
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# UNITED STATES PATENT OFFICE.

JOHN J. KRAISS, OF EAST WILLIAMSFIELD, OHIO.

## IMPROVEMENT IN SPRING-VEHICLES.

Specification forming part of Letters Patent No. **221,173**, dated November 4, 1879; application filed August 16, 1879.

*To all whom it may concern:*

Be it known that I, JOHN J. KRAISS, of East Williamsfield, Ashtabula county, Ohio, have invented a new and useful Improvement in Spring-Vehicles, of which the following is a specification.

The invention relates to the manner of attaching and supporting the springs.

The object of my invention is to provide support for the springs between the axles, and to stay them by means of brace-rods, and also to provide adjustable and detachable side springs stayed by brace-rods and supported by hangers attached to side bars.

In the accompanying drawings, in which similar letters of reference indicate like parts, Figure 1 is a plan showing the frame of the vehicle without the top and wheels. Fig. 2 is a side elevation of the frame. Fig. 3 is a section representing the connection of a side spring with the box-frame.

The hind axle, *a*, side bars, *b b*, and bolster *a'* are rigidly attached together. The front axle, *a<sup>2</sup>*, is connected in the ordinary manner, by a king-bolt, with bolster *a'*. The upper spring-bars of end springs, *b' b'*, and side springs, *d d*, are attached to the under side of box-frame *f*. The springs *b' b'*, Fig. 2, are supported and stayed by the reach-rod *a<sup>3</sup>* and brace-rods *i* and *e*, and the front spring by additional rods *e'*. The side springs, *d d*, are supported by plates *s* attached to hangers *s'* and stayed by brace-rods *e* and *c<sup>3</sup>*. The hangers *s' s'* are rods bolted to side bar, *b*, and support plate *s*, on which rests the lower spring-bar, *e'*.

The end of cross-rod *c<sup>3</sup>* is secured to plate *s* by screw-bolt *x'*, which passes through the lower part of spring *d*, spring-bar *e'*, plate *s*, and cross-rod *c<sup>3</sup>*, and fastens them together by a nut.

Each diagonal brace or stay rod *e* is attached at one end to plate *s*, and at the other end to the lower spring-bar, *e'*, of spring *b'*. The reach-rod *a<sup>3</sup>*, extending lengthwise of the vehicle between the axles, is secured at one end against the under side of the front axle, *a<sup>2</sup>*, by an ordinary king-bolt, which passes through it and the axle and bolster *a'*. The rear end of reach-rod *a<sup>3</sup>* is bent upward and bolted to the hind axle, *a*.

By bending one or both ends of reach-rod *a<sup>3</sup>*, it may be made to extend between the axles at any desired distance below them.

In ordinary spring-vehicles the springs are placed on the axles, and the greater pressure is on the hind spring, which requires that it should be made heavier and stronger than the forward spring.

I place the forward and hind springs (which may be of equal strength) on the reach-rod *a<sup>3</sup>* in any desired position, or so as to equalize the pressure on them. Their lower spring-bars, *c<sup>2</sup>*, are to be firmly attached by bolting, or in any usual manner, to the rod *a<sup>3</sup>*. The inner ends of their diverging stay-rods *e i e'* are secured to the spring-bars by ordinary screw-bolts for attaching springs and spring-bars.

The outer ends of the braces or stay-rods are bolted to side bars, *b b*, axle *a*, and bolster *a'*. The brace or cross rod *c<sup>3</sup>* supports the reach-rod *a<sup>3</sup>* at or near its center, and is bolted to plates *s s*.

The side springs, *d d*, are bolted to plates *s s* and frame *f*, the plates and frame being slotted for the purpose of adjusting the springs forward and backward. Spring-bar *e*, Fig. 3, is formed with a projecting ridge, which enters and fits slot *d'* to prevent spring *d* from turning on screw-bolt *x*.

Spring *d* is secured to frame *f* by screw-bolt *x*, which passes through slot *d'* and is secured by a nut. The lower part of spring *d'* is secured in a similar manner by screw-bolt *x'*.

After loosening the nuts on screw-bolts *xx'* the springs *d d* may be adjusted by sliding the bolts and spring-bars *c c'* in the slots.

When the vehicle has a light load, springs *d d* may easily be removed on taking out bolts *xx'*.

I claim as my invention—

1. Vehicle-springs placed between, and parallel to, the axles, in combination with, and supported by, the reach-rod *a<sup>3</sup>* bent upward to one or both of the axles, to which it is attached, and extending lengthwise of the vehicle, between and below the centers of the axles, the cross-rod *c<sup>3</sup>* connected with side bars, *b b*, and diagonal brace-rods or stays, substantially as described.

2. The removable and adjustable side springs;

*d d*, in combination with the slotted box-frame *f* and slotted plates *s s*, bolts *x x'*, side bars *b b*, and hangers *s' s'*, substantially as described.

3. Vehicle-springs placed between the axles supported by the reach-rod *a<sup>2</sup>*, diagonal stay-rods *e*, and cross-rod *c<sup>2</sup>*, in combination with detachable and adjustable side springs, *d d*,

slotted box-frame *f*, slotted plates *s s*, screw-bolts *x x'*, hangers *s' s'*, and side rails, *b b*, substantially as described.

JOHN J. KRAISS.

Witnesses:

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