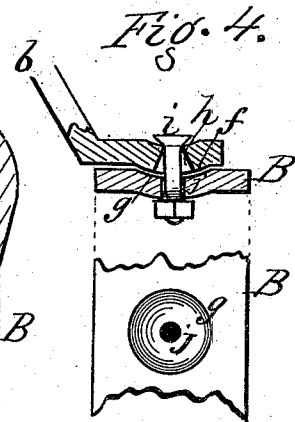
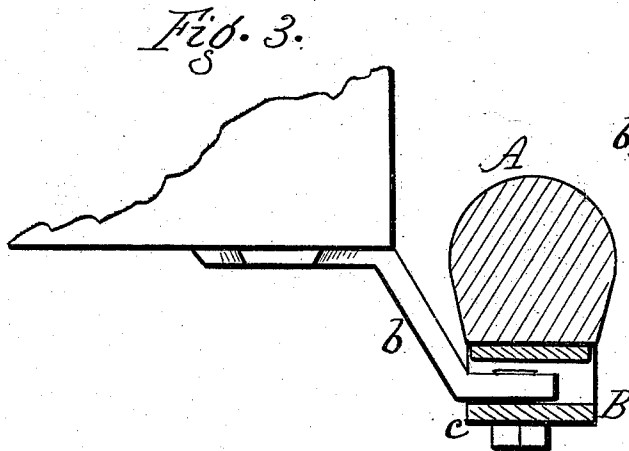
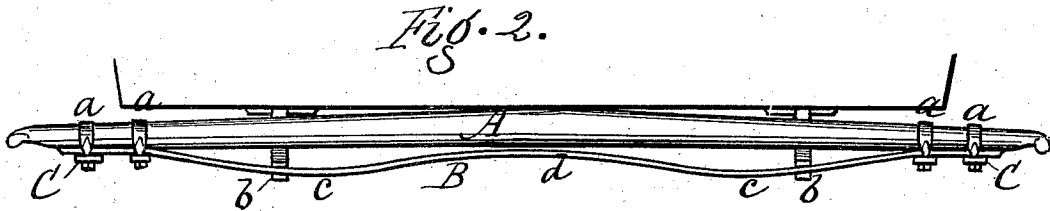
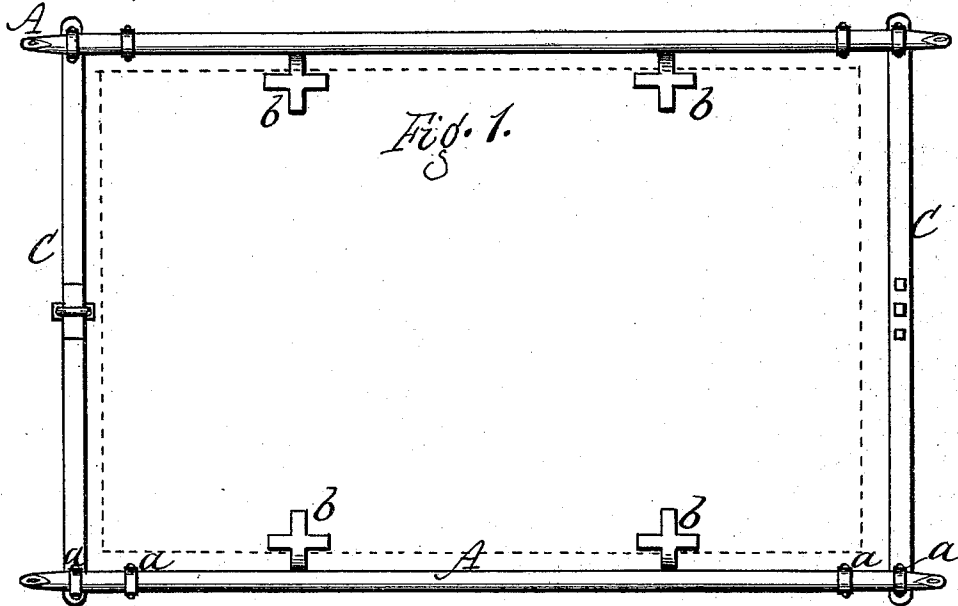


J. CORNWALL.
CARRIAGE-SPRING.

No. 173,908.

Patented Feb. 22, 1876.



Witnesses.
E. B. Scott.
Louis Spahn.

Inventor.
John Cornwall,
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Atty.

UNITED STATES PATENT OFFICE.

JOHN CORNWALL, OF ROCHESTER, NEW YORK.

IMPROVEMENT IN CARRIAGE-SPRINGS.

Specification forming part of Letters Patent No. **173,908**, dated February 22, 1876; application filed August 16, 1875.

To all whom it may concern:

Be it known that I, JOHN CORNWALL, 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 side bars and springs, with the carriage-body removed from place. Fig. 2 is a side elevation of one of the side bars and side springs. Fig. 3 is an enlarged cross-section of one of the side bars and side springs, showing the method of attaching the wagon-body to the springs. Fig. 4 is a detail view.

My improvement relates to that class of carriages in which side bars and a rectangular spring-frame, composed of side springs and end springs, are used to support the carriage-body.

The invention consists in an improved construction of the side springs, combined with the side bars and end springs, as hereinafter described; also, in an improved construction of the body-loops combined with the side springs, whereby twist and strain are in a great degree avoided, all as hereinafter set forth.

In the drawings, A A represent ordinary wooden side bars of a light carriage. B B are the side springs, and C C are the end or cross springs. These side and end springs are connected together at the corners, to form a rectangular spring-frame to support the carriage-body, which latter is indicated by the dotted lines in Fig. 1. The side springs are of peculiar construction. Usually they have been attached in the center to the center of the cross-bars, by clips or otherwise, and the ends of the springs have been free of the side bars and independent in their action. In such case the vertical rockings or vibrations of the carriage-body cause great play or end-motion of the side springs upon the cross-springs, which produces friction and is a source of much trouble, and soon wears or twists the springs so as to render them defective. I reverse this order by attaching the ends of the side springs to the ends of the cross-bars by double clips *a*,

(one of which also attaches the side spring to the end spring,) thereby leaving the whole central length of the side springs free from the side bars, and the carriage-body is attached to the side springs, between the points of attachment, by short body-loops *b b*, bolted to the bottom of the carriage-body and to the top of the side springs, about one-quarter of the distance of the length of the side springs, more or less.

In order to give proper elasticity, and to compensate for the rising and falling of the side springs under the vertical rockings of the carriage-body, I construct each spring of double ogee or waved form, having a downward curve, *c*, under each body-loop, and an upward curve or arch, *d*, in the center, between the body-loops, which sets up against or near to the side bars, with a packing between it and the side bars. The length of the side springs between the points of attachment is, therefore, greater than that of the side bars to which the said springs are attached, owing to this curved form.

By the attachment of the side springs to the ends of the side bars, instead of to the center, as in the old style of side-spring carriages, less vertical rocking or vibration is produced at the outer ends, together with less transverse motion at the sides, thereby making the carriage "track" closer after the horse, and in a direct line; at the same time, all the advantages of a side and cross spring wagon are attained, which form is considered superior to all others by experienced horsemen.

A special advantage arises from the reverse bends *c d*. The springs are thereby lengthened beyond the length of the side bars, by which means the elasticity of the springs is retained, which could not be the case with end attachments, if perfectly straight. These bends have the peculiar effect of allowing the body-loops to work up or down easily with the carriage, while the central curved arch *d* absorbs the unequal expansion and contraction produced by such vibrations. In depressing the springs, the tendency is to straighten the same, since the ends move from a center which is the end attachment of the spring to the side bar, and in that case the central arch *d* straightens to a certain extent, to compensate for the

expansion. In the backward and forward rocking of the carriage-body, this arch *d* also furnishes the extra elasticity to take up the lost motion and bring the motion to an equilibrium. There will be less rocking motion to the carriage-body, for the reason that the rocking is toward the center instead of outward, away from the center, as in side-bar wagons having the ends of the springs free.

The form of the spring above described is specially adapted to one having its ends attached to the ends of the side bar instead of to the center. The springs may be stiffened, if desired, by extra layers or leaves, in the usual way. The under portion of the side bars may also be grooved out, if desired, on the rear side, so as to form a rebate to receive and hide, or partially hide, the side spring.

In order to give freedom of motion between the body-loops and side springs, I employ the following arrangement: I form upon the bottom of the body-loop a convex circular bearing, *f*, and form in the top of the side spring a corresponding circular indentation, *g*, which receives the circular bearing of the body-loop. I form through the spring a plain hole, *j*, and also in the bearing of the body-loop a conical or countersunk hole, *h*, through which passes the bolt *i*, having an angular head on top and a nut upon the bottom. The curved bearing of the loop turns freely in the corresponding cavity of the spring, and the conical hole in

the body-loop allows the movement around the screw without binding. By this means all strain and binding between the body-loops and spring caused by the rocking motion of the carriage or the depression of the springs are obviated, and less wear and friction occur, and there is no danger of cutting out or bending the bolt.

Having thus described my invention, I do not claim, broadly, side bars nor side springs; nor do I claim a rectangular spring-frame to receive the body of the carriage; but

What I claim as new is—

1. In a side bar wagon, the combination of side bars *A*, cross-springs *C*, side springs *B*, permanently attached at the ends to the ends of the side bars, and having curves *c c d*, whereby elasticity is produced and the vibrations of the carriage-body are compensated for, as set forth.

2. The combination with the body-loop *b*, having a conical hole through it and the convex bearings *f* on its bottom, of side springs *B*, having concave indentations *g* in their tops, and the bolt *i*, as and for the purpose specified.

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

JOHN CORNWALL.

Witnesses:

R. F. OSGOOD,
E. B. SCOTT.