(No Model.)

W. VAN ANDEN.

CARRIAGE SPRING.

No. 271,953. Patented Feb. 6, 1883.

Fig. 1.

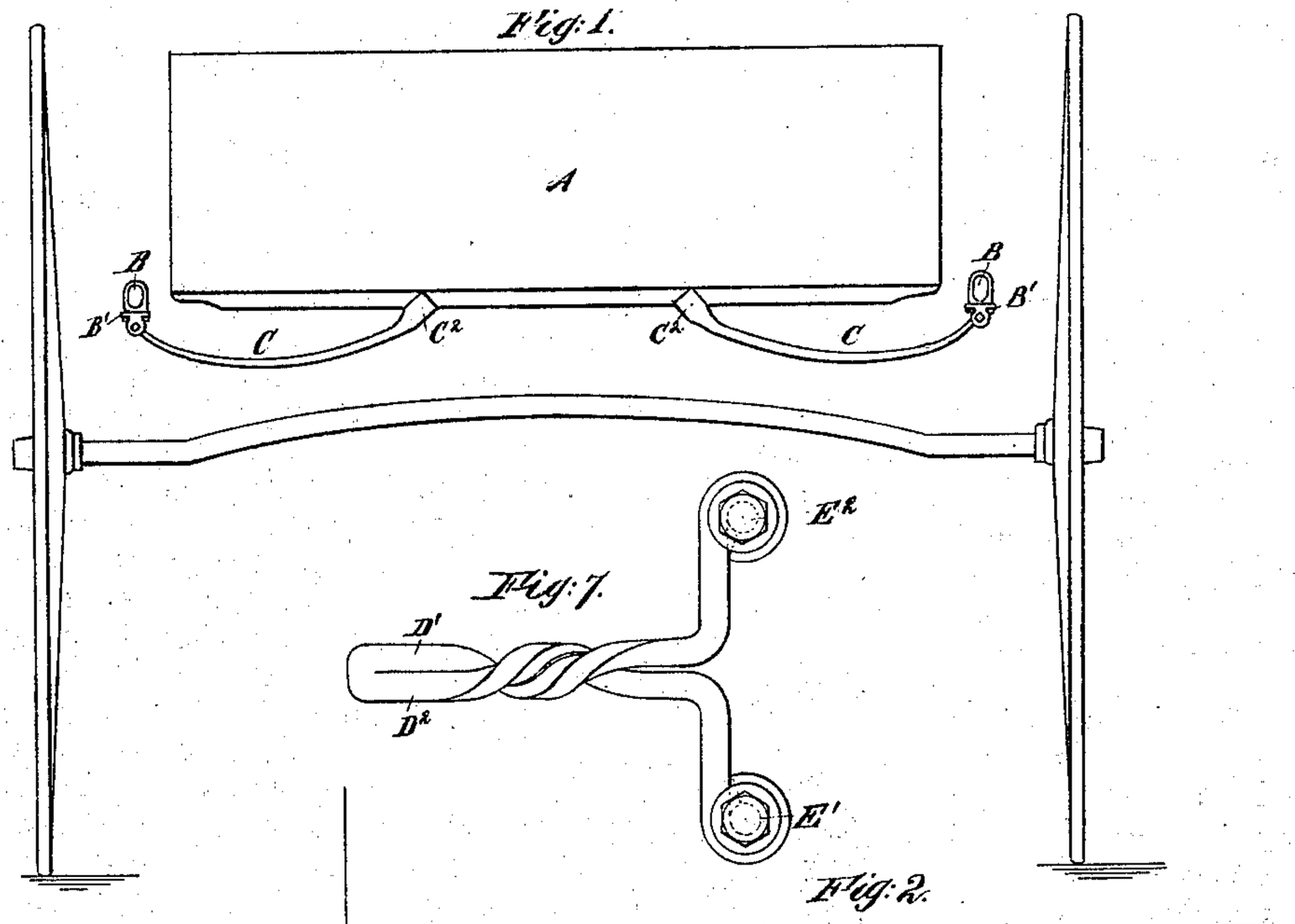


Fig. 2.

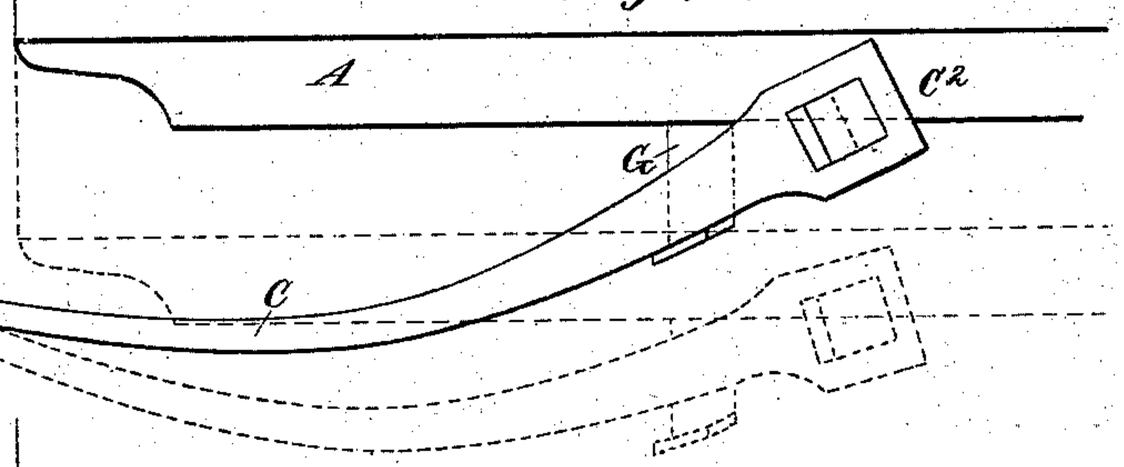
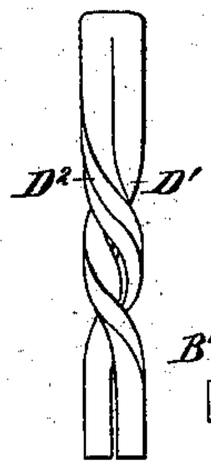


Fig. 6.

Fig. 5.



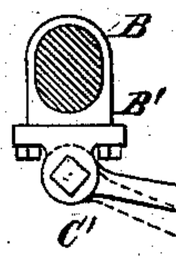


Fig. 3.

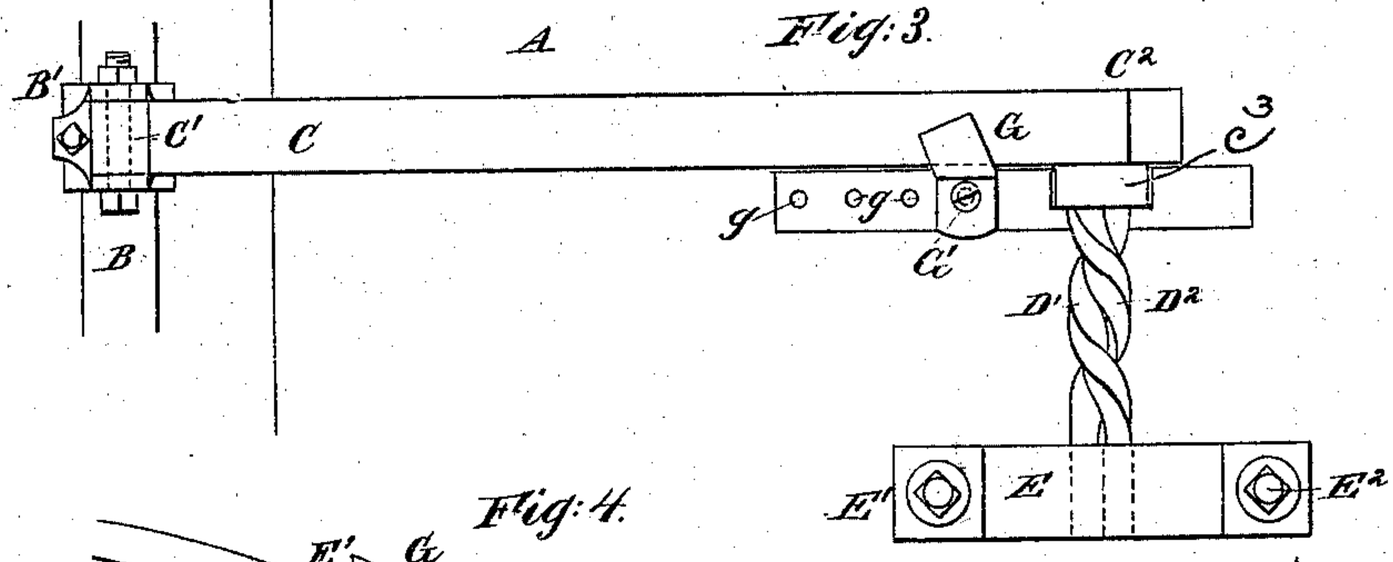
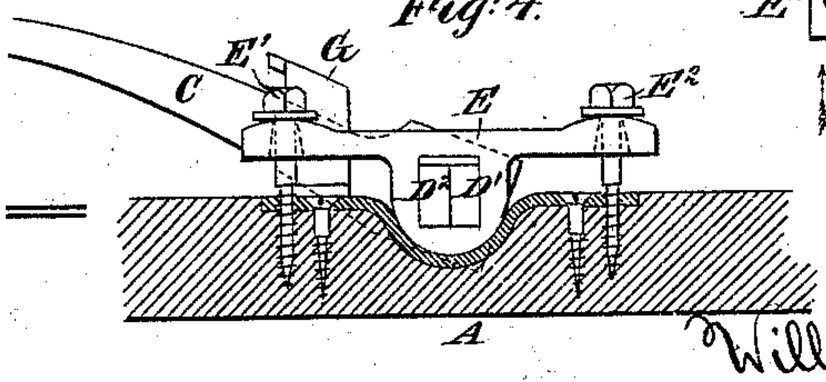


Fig. 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

WILLIAM VAN ANDEN, OF NEW YORK, N. Y.

CARRIAGE-SPRING.

SPECIFICATION forming part of Letters Patent No. 271,953, dated February 6, 1883.

Application filed November 4, 1882. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM VAN ANDEN, of New York city, in the county and State of New York, have invented certain new and useful Improvements relating to Carriage-Springs, of which the following is a specification.

The improvements may apply to heavy carriages of all sizes and styles; but I have experimented with light vehicles, and will describe them so applied.

The springs act by increasing and diminishing a compound helical form. I give the parts a helical or corkscrew form, and arrange two or more such parts parallel or nearly parallel to each other, so conditioned that the strain due to the load and to the jolting of the carriage tends to increase the helical condition and tighten them together, and the elasticity of the metal tends to slightly open the helical joint or space between them. The effect is to brace and stiffen the spring after it has acted to a proper point by the contact of the adjacent helical surfaces each with the other. In other words, the spring will twist by the natural elasticity of the material until the joint is closed tightly together. Then it will not twist any further. I take hold of the end of my compound spring by a movable piece provided with means for adjusting its position. I can by this means vary the tension of the spring at will, so as to adapt it to a heavier or lighter carriage or to rougher or smoother roads. Such adjustments may be made at short intervals, if necessary. I propose usually to change the adjustment only at rare intervals in adapting the carriage to a general set of conditions, and only altering it afterward when the ownership, locality, or general use are to be changed. I provide a stop, which limits the amount to which the carriage may rise. I make this also adjustable.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a rear view, showing a carriage-body connected to ordinary side bars by means of my invention. The remaining figures are on a larger scale. Fig. 2 is a corresponding rear view of a portion. Fig. 3 is a plan seen from below. Fig. 4 is a view in the direction indicated by the arrow in Fig. 3. This also shows the parts inverted. Fig. 5 shows the spring detached in an open or unloaded condition. Fig. 6 shows the same after it has been loaded to a sufficient degree to tightly close the parts together. Fig. 7 represents a modification in the form of the spring.

Similar letters of reference indicate corresponding parts in all the figures.

A is the body of the carriage. It may be of any ordinary or suitable style.

B B are side bars, connected to the running-gear in any ordinary or suitable manner, either rigidly or through suitable springs. (Not shown.) My invention is applied to afford elasticity between the wagon-body A and the side bars, B, or the equivalent thereof.

C C are levers, of steel or other suitable material. At the small end of each is an eye, C′, for taking hold of the side bar by means of a clip or shackle, B′. The other end, C^2, is formed with a suitable orifice to receive and firmly hold the spring. Adjacent to the end C^2 of the lever C is a collar, C^3, fitted on the spring and smoothly finished on its upper side.

D′ D^2 are two helical or corkscrew formed parts of my spring. They are secured together at one end in the end C^2 of the lever C. The end of each is compelled to turn as the lever vibrates with the working of the carriage. They are secured together at the other end in an adjustable piece, E, which is fitted in a shallow recess in the body A and secured by adjustable bolts E′ E^2, arranged as shown. When it is desired to change the tension of the spring the bolt E′ is slackened and the bolt E^2 tightened, or the reverse, so as to tilt the piece E, and consequently to change the position of the ends of D′ D^2, which are held by it.

G is an adjustable stop, held by a bolt, G′, which latter may be shifted into any of the several holes *g*. This piece serves to arrest the lever C. It prevents the body A from ever rising too high. By changing the position of these stops the extent to which the carriage-body A is allowed to rise can be controlled at pleasure.

The parts D′ D^2 may be formed from the same piece of metal, taking a piece of good spring-steel of proper section and of sufficient

length to serve for both and heating and doubling it at the middle. The twist can be imparted in the same manner as has long been practiced in the manufacture of screw-augers, taking care to preserve a sufficient portion at each end untwisted. It is important to have the twisted portions a little distance apart while the spring is unloaded, and to so arrange that the load shall by twisting the compound spring formed by the two parts D′ D² close up the joint between them. The effect is that the spring resists the descent of the carriage-body by the ordinary elastic force of its two parts, D′ D², until the strain has twisted both to such an extent that the space between these parts is closed. Then the parts D′ D², by their pressure against each other, brace and stiffen each other. When further force is applied the spring is practically rigid. I have in my experiments attained the proper condition by twisting the two parts D′ D² hot to a little more than the extent required, and then untwisting a little and hardening and tempering. I took proper-sized steel and, giving it the proper heat, twisted it once and a quarter around, and then untwisted it a quarter.

It will be observed that my invention allows any one spring to be adjusted independently of the others. The carriage can be adjusted to sustain a heavy person on one side while a light person occupies the other side, and the carriage-body stands substantially level. Four of these springs are sufficient for a light vehicle; but more may be used for heavy carriages. All the figures show the spring as formed of only two helical parts, which increase and diminish their distance from each other or open and close with the motion. They also show these parts as formed from the same piece of steel folded upon itself and twisted; but neither of these conditions is essential. The spring may be made of three, four, or other considerable number of helical parts. Such parts may be originally each a separate piece of steel. The drawings show the parts of the spring as of rectangular section. A good size of the steel for ordinary buggies is half an inch by a quarter of an inch in section. The proportions may be widely varied. I can use square steel. I can use steel much more flattened. I can use round or half-round steel. When half-round steel is used the flat sides should be laid toward each other.

Instead of providing a separate casting, E, by which to effect the adjustment, I can forge the spring with arms at the end and with a proper bearing for allowing a tilting motion, and apply the bolts E′ E² directly to those arms. I can make the levers C of different lengths and thickness. I propose to make all the parts of great strength, and to employ the springs for heavy carriages and railroad-cars. The helical form of the parts of my spring may be reduced; or it may be increased beyond that which is shown and described. I can use steel of various grades or other elastic metal for the parts D′ D². Instead of the collar C³ to form the bearing upon which the spring rolls in its contact with the seat A, I can make a corresponding boss in the same position fast on the side of the lever C. I prefer the loose collar, as above described.

I claim as my invention—

1. The compound spring composed of helically-formed parts D′ D², applied together, substantially as and for the purposes herein specified.

2. As a spring for carriages, the compound spring composed of helical parts D′ D², applied together, in combination with the lever C, having a boss, C², adapted to serve as herein specified.

3. As a spring for carriages, the compound spring composed of helical parts D′ D², applied together, with an open joint, in combination with the lever C, secured to one end, and with the adjusting means, E′ E², for changing the position of the other end, substantially as herein specified.

4. As a spring for carriages, the compound spring D′ D², lever C, and stop G, combined and arranged to serve substantially as herein specified.

In testimony whereof I have hereunto set my hand, at New York city, New York, this 30th day of October, 1882, in the presence of two subscribing witnesses.

WM. VAN ANDEN.

Witnesses:
M. F. BOYLE,
H. A. JOHNSTONE.