G. F. GODLEY.

Car-Spring.

No. 161,115. Patented March 23, 1875.

Fig. 1

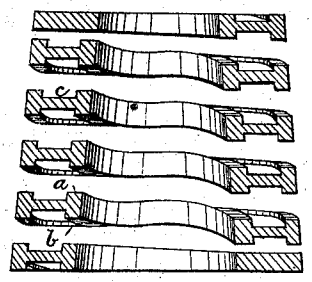


Fig. 2.

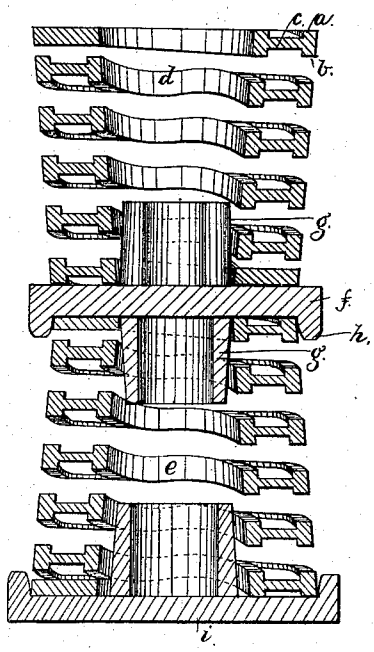


Fig. 3.

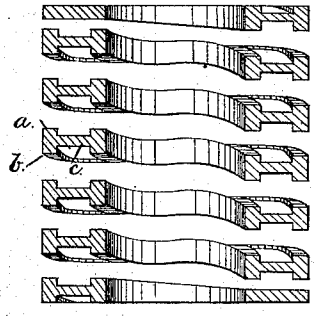


Fig. 4.

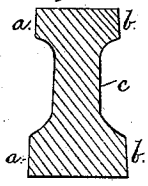


Fig. 5.

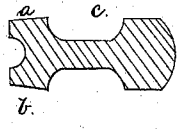


Fig. 6.

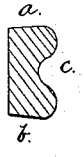
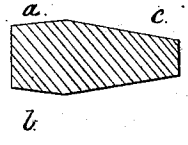


Fig. 7.



WITNESSES

Geo. T. Smallwood, Jr.

John Robey Jr.

INVENTOR

Geo. F. Godley.

By: John J. Halstead
ATTORNEY

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

UNITED STATES PATENT OFFICE.

GEORGE F. GODLEY, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN CAR-SPRINGS.

Specification forming part of Letters Patent No. **161,115**, dated March 23, 1875; application filed February 15, 1875.

To all whom it may concern:

Be it known that I, GEO. F. GODLEY, of the city and county of Philadelphia, State of Pennsylvania, have invented new and useful Improvements in Springs; and I do hereby declare that the following, taken in connection with the drawings which accompany and form part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

My improvements consist in a bar for making a spiral spring, having the two opposite flat surfaces of the thickest part relatively inclined toward each other, so that, when the bar is coiled, such inclined surfaces shall become parallel with each other, by reason of the outer part being extended and thinned while the inner part becomes compressed and thickened; and it further consists in combining two such conical springs, one on top of the other, by employing a wooden or iron piece having hubs projecting into the center of each, and serving to prevent their separation.

In the drawings, Figure 1 shows a vertical section of a spring coiled into a cone shape, and made from one form of my improved bar. Fig. 2 shows a vertical section of two of such cone-springs when used one upon the other. Fig. 3 is a spring of cylindrical form, or of uniform diameter, made from a similar bar. Fig. 4 shows a cross-section of the bar of a size suitable for a car-spring, and before it has been coiled to form the springs shown in Figs. 1, 2, and 3; and Figs. 5, 6, and 7 represent cross-sections of several varieties of bars, having their opposite faces inclined to a degree which will insure their becoming parallel after being coiled.

In the bar and spring shown in my car-spring patent No. 155,578, I secured great advantages of strength and carrying capacity, but the bars there described were all parallel-sided before they were coiled, and of necessity, after being coiled, this parallelism was lost and destroyed, and upon being pressed closely together two adjacent coils did not rest flatly upon each other across their surface, but merely touched at a point or line at the edges of their thickest part.

In my present construction it will be seen that the faces *a b*, which, in the blank or uncoiled bar incline to each other, in the coiled spring become parallel with each other, thus affording a broad base or bed for the coils whenever a heavy load or a sudden compression shall bring the coils into contact. Moreover, there is greater strength in the spring itself than when there is not equality of thickness in the body of the coiled bar. The spring being made of steel and tempered, it will be understood that the thinnest part *c* will be tempered throughout, giving the requisite resilience or elasticity, while the thicker portion, being only surface tempered, retains a toughness conducive to strength. When coiled into the cone shape, the compression of the spring exhausts the resilience of the largest part first, so that, as the pressure increases, one coil lies flat upon the next one, just as one leaf of an elastic spring lies upon the next leaf, and the coils are not injured in the least when so compressed, because of the adjacent surfaces being flat and parallel.

In Fig. 2 two springs, *d e*, such as above described, are shown arranged for use as a compound spring, the two being loosely connected by employing a plate, *f*, of wood or iron, having axial projections or pins *g*, which are respectively lodged in the smaller end of each spiral, the plate having, if desired, a rim, *h*, on either or both faces; and I also use a similar plate, *i*, having, however, but one central boss or pin, for the top or bottom, or for both. In this mode of using my improved spring—that is, in two parts, which I find desirable in some cases—as, for instance, for a passenger-car bolster-spring, I secure an increased amount of resiliency, and if by accident either part should break it can easily be removed, and another substituted. But for most purposes I find that practically a single spring of my construction affords as soft and easy a motion as is needed.

Instead of coiling the bar in the form of a cone, it may be coiled on a cylindrical mandrel, and thus be of uniform diameter throughout.

When desired for a bearing-spring, a nest, or several of these springs, either conical or cylindrical, are placed side by side in a box, which may be skeleton or otherwise, or they can be inserted in the bolster by boring a hole

in the same when space permits, and the spring introduced into the same, the springs forming, as it were, their own seats, as they all have a broad flat base adapted to rest upon a plane.

I employ bars of various other forms in cross-section, all, however, having the especial characteristic first-above named, to wit, their opposite sides so inclined to each other that when the bar is coiled they shall become parallel, whether the thinner part be coiled on the outside or inside of the coil, and whether the full width of the bar be thus parallel or otherwise.

While my improved construction is admirably adapted for railway-cars, yet it is applicable for almost every purpose where a coiled spring can be employed.

I claim—

1. A spiral solid plate-spring, having the upper and lower surfaces of the thickest part of the plate parallel when coiled, substantially as set forth.

2. A spiral solid plate-spring, having the opposite surfaces of the plate parallel when coiled, and the plate itself thinner at its central portion, substantially as set forth.

3. The combination, with the two cone-shaped coils, *d e*, of the plate *f* provided with axial projections, substantially as set forth.

GEORGE F. GODLEY.

Witnesses:

EDWIN F. GLENN,

THEODORE JORDAN.