B. A. CLOONEY.

Car-Springs.

No. 158,361. Patented Jan. 5, 1875.

*Fig. 1.*

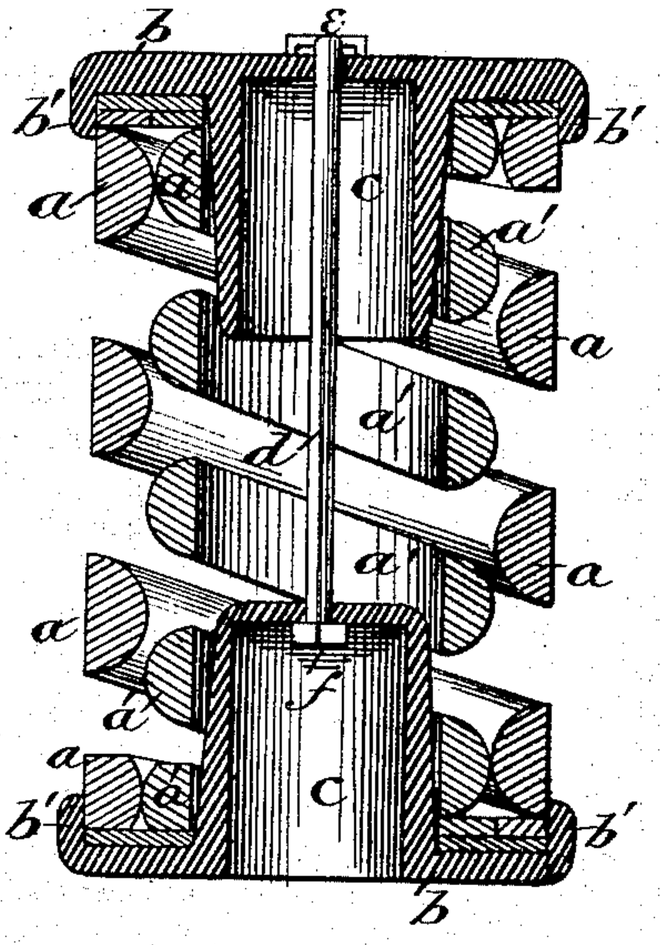



*Fig. 2.*

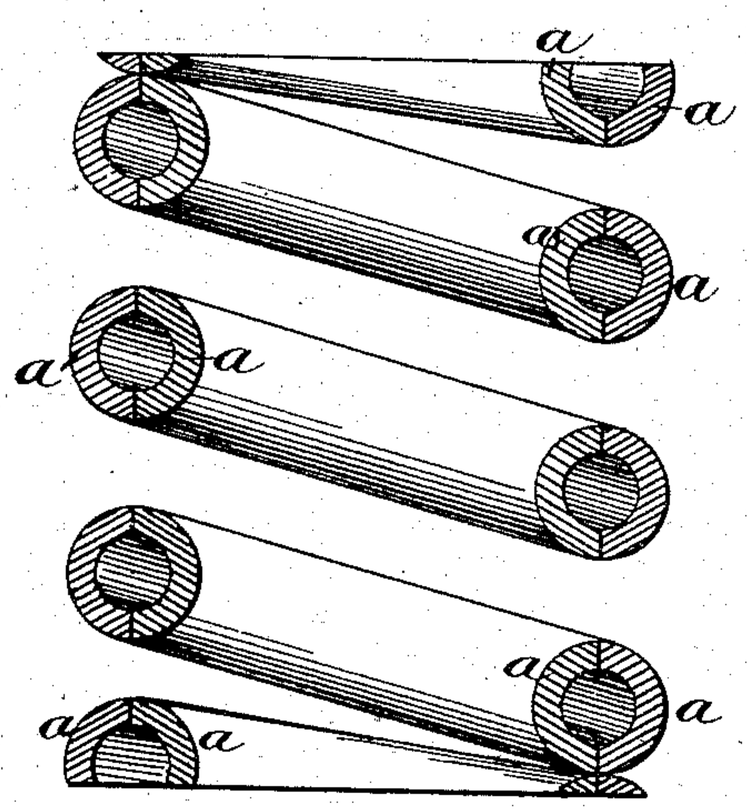
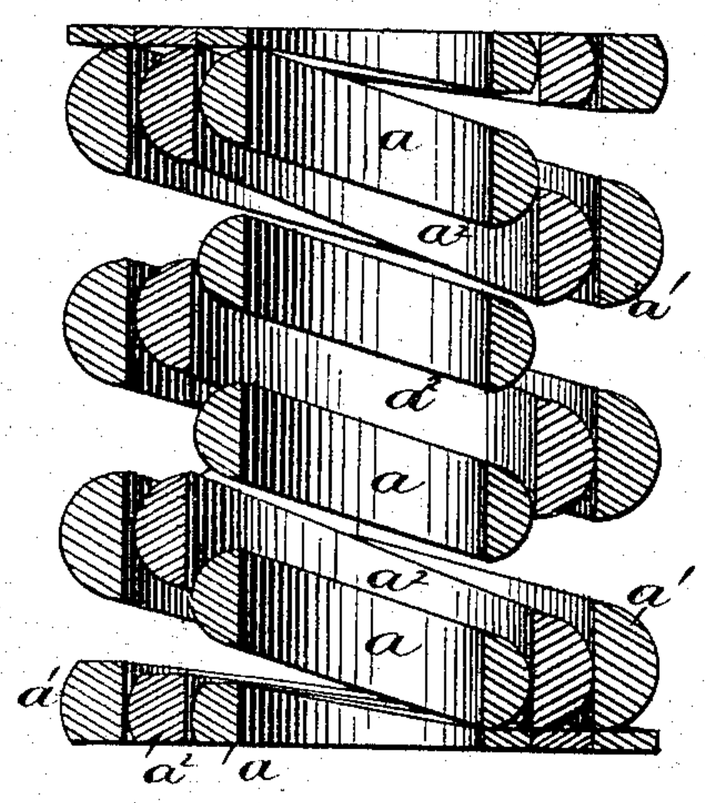



*Fig. 3.*

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# UNITED STATES PATENT OFFICE.

BENJAMIN A. CLOONEY, OF NEW YORK, N. Y., ASSIGNOR TO THE NEW YORK CAR-SPRING COMPANY, OF SAME PLACE.

## IMPROVEMENT IN CAR-SPRINGS.

Specification forming part of Letters Patent No. **158,361**, dated January 5, 1875; application filed August 28, 1874.

*To all whom it may concern:*

Be it known that I, BENJAMIN A. CLOONEY, of the city and State of New York, have invented new and useful Improvements in Springs Suitable for Railroad-Cars, of which the following is a specification:

My invention relates to that class of springs which are composed of steel spiral coils; and the object of my invention is to produce a spiral spring in which the fibers of the steel are not twisted or distorted in rolling or coiling, and in which, with the same amount of metal in the coils, the tempering-surface may be much enlarged, and the steel coil also much better and more uniformly tempered, and thus increase the strength and elasticity of the spring, and reduce the size and amount of metal therein; and my invention consists in making the spring of half-round or semi-cylindrical steel bars, or bars of substantially similar form, which, being coiled into spirals of different diameters, are placed concentrically or collaterally together, with their round or flat sides inward or outward, as may be most convenient or useful.

The shape of the bars and manner of constructing the spring from the coils, and the arrangement of the coils as to the positions of their flat or round sides, are shown in the drawing at Figures 1 and 3, Fig. 1 being a spring constructed of two concentric coils of half-round or semi-cylindrical bars, and Fig. 3 representing a spring composed of three concentric coils of the same.

These figures of the drawing represent vertical cross-sections through the center of the springs.

In Fig. 1 the two coils, placed concentrically, are composed of half-round bars $a$ $a^1$, and are set in an open case, in which $b$ $b$ are the caps or top and base, which have attached to them hollow projecting tubes $c$ $c$, which extend far enough into the coils to allow sufficient play of the spring, and to act as a cut-off, and which may be held together by the bolt $d$ passing through them, with a nut and screw on the end of the bolt, as shown at $e$, and the head of the bolt secured at the other end, as shown at $f$; or the bolt may be dispensed with. In this spring the coils are made one with the flat side inward, $a^1$, and the other flat side outward, $a$.

In Fig. 3 the spring is composed of three concentric coils, $a$ $a^1$ $a^2$, and the flat sides are all on the inner side of the coil, and these constitute together a nest-spring, in which the strength and elastic force are greatly increased in proportion to the weight of metal over springs composed of the ordinary round or flat square bars.

In springs constructed with castings, as shown in Fig. 1, I find it very useful to place between the ends of the spirals and the inner faces of the caps a ring or disk of rubber, which is held in place by the projecting lip or flange $b'$. This cushion of rubber or of other suitable elastic material thus interposed between the ends of the steel coils and the castings prevents rattling between the two metals, and beds the ends of the springs in a yielding material, which serves to protect the spring against shocks, and to hold it in a vertical position, so that it will not buckle or get out of line.

In Fig. 2 is shown a spring, in which the form of the coiled bar is a grooved half-round, the two hollow or grooved surfaces being placed together face to face, as shown at $a$ $a$.

This is a modification or variety of form of my improvements which embodies the features and advantages of the principle of the springs represented in Figs. 1 and 3.

Among the advantages of this form of the bars of spirally-coiled springs it is an important and valuable feature that in drawing the steel bar through the rolls it can neither turn nor twist, and thus the bar comes from the roll with the fibers of the metal all uniformly laid side by side, without flaws or distortions. It also possesses similar advantages in coiling, for, the flat side being flush with the mandrel when the flat side is coiled inward, the steel bar cannot twist or swerve nor be distorted; and when the flat side is coiled outward, the roller or follower then acts upon the flat surface with a similar effect.

Another advantage of this construction is that, the bar not being twisted or distorted in the rolls or in coiling, the ends of the bars can be sheared off by shears diagonally, so as

to produce, when coiled, a flat top and base for the spring, which are parallel to each other, so that the spring will stand square and upright. This cannot be done with round or circular shaped bars, owing to the turning of the bars in coiling. The shearing the ends saves much time and expense, which attend upon forging the ends of the bars.

When the steel bar is made in the half-round form, as above described, or of substantially similar form, the tempering is more easy and better performed, and covers a greater portion of the metal than in the case of round or square bars, for in the half-round the temper penetrates deeper from there being less material, and covers greater surface. Thus, for example, if a spring is to be made of a bar equal to one inch in diameter in metal, if this is divided into two half-round bars, and they are coiled so as to fit one within the other, the uniform temper of the metal and free action of the two parts will make the spring more elastic, and it will carry nearly one-third more weight; and in such a spring it is evident that when a one-inch bar diameter would have three inches of tempered space, the two half-round bars of the same amount of metal would have five inches tempered space in each inch of the length.

Having thus described my invention, and the nature and operation of the same, what I claim, and desire to secure by Letters Patent, is—

1. A spring composed of half-round or grooved half-round steel bars coiled into a spiral form, to operate substantially as set forth.

2. A spring composed of half-round or grooved half-round bars, in combination with a cap and base, and elastic cushions inserted in a recess in the cap and base, to operate substantially as set forth.

B. A. CLOONEY.

Witnesses:
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