F. W. RHINELANDER.

Car Spring.

No. 99,475. Patented Feb. 1, 1870.

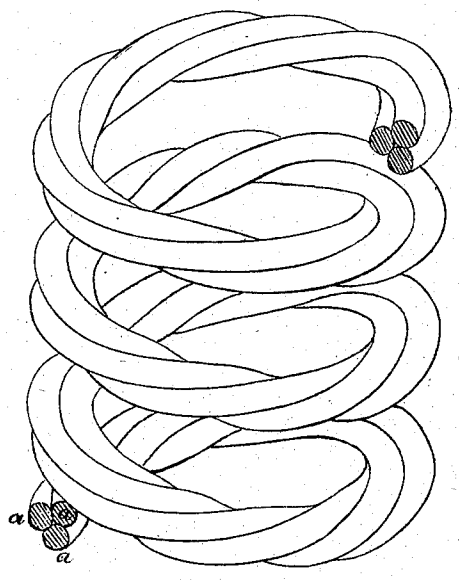


FIG. 1.

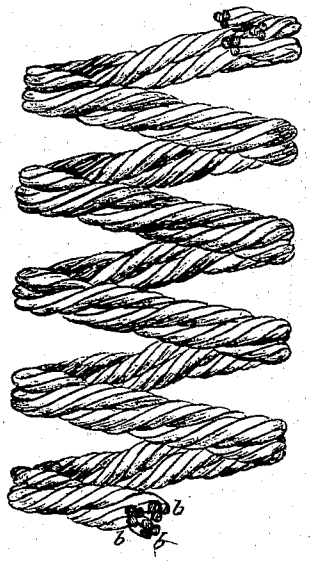
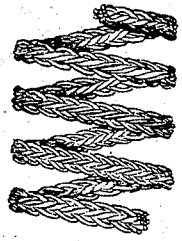


FIG. 2.

FIG. 3.



F. W. Rhinelander.
by his Attorney
Pollok

WITNESSES.

J. M. Baird

Wm. H. Hall

United States Patent Office.

F. W. RHINELANDER, OF NEW YORK, N. Y.

Letters Patent No. 99,475, *dated February* 1, 1870.

IMPROVED RAILWAY-CAR SPRING.

The Schedule referred to in these Letters Patent and making part of the same.

To whom it may concern:

Be it known that I, F. W. RHINELANDER, of the city, county, and State of New York, have invented certain new and useful Improvements in Metallic Springs for Railroad-Cars, and other purposes; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing, in which—

Figures 1, 2, and 3, represent different forms of springs, made in accordance with my invention.

It is difficult to harden or temper steel uniformly of more than five-eighths of an inch in thickness, and spiral springs are generally limited to that thickness, so that when a spring of greater capacity than one spiral will afford, is needed, it is customary to combine spirals in groups or nests. If in groups, cases are needed to enclose them; if in nests, the spirals vary in character, having the same range of motion, but differing in diameter, carrying-capacity, pitch, and character of elasticity.

To avoid these objections which have been urged against the spiral springs now in use, and to make a spiral spring which shall have the capacity of a given group or nest, and yet be easily and uniformly hardened or tempered, if required, the spring to be described has been invented, which is homogeneous, independent of cases, and capable of being made to fill any required space more easily than any combination of separate spirals.

As shown in the accompanying drawings, the spiral is formed of two or more metallic wires or rods, twisted or braided into the form of a rope, of circular, oval, or rectangular sectional area, as may be most advantageous to meet requirements of space, capacity, and character of action, the strands of the rope or braid, in case steel wire is employed, being sufficiently separated to admit of hardening by the usual process.

In Figure 1, the rope from which the spiral is formed is represented as composed of three strands of wire, *a*, twisted together;

In Figure 2, the rope is composed of three smaller ropes, *b*, twisted together, each one of these smaller ropes being made up of three twisted strands; and

In Figure 3, the spiral is formed of a strip made by braiding together a suitable number of wires. The twisting and braiding is effected in any ordinary or suitable manner, and any number of wires may be used in forming the rope or braid.

One of the great advantages of the elliptic, as a bearing-spring for carriages, cars, &c., is the character of its reaction, which is checked by the friction between the leaves; and so being free from the excessive vibration common to all highly-elastic springs, such as spirals, India rubber, &c., the elliptic is used in many places where springs of quick reaction would be unserviceable.

The spiral spring, made as shown in the drawing, of braids or ropes of wire, has the checked reaction due to the friction of the bearing-surfaces. Each strand of the rope or braid constitutes a separate spiral, and these separate spirals may be considered as inclined planes, bearing more or less on each other, and producing a uniform friction, corresponding to that of the elliptic. By regulating the braiding or twisting, an amount of friction may be attained which will enable this spring to be used for many purposes for which the elliptic alone is now suitable.

If it should be desired to still further check the reaction of the spring, one or more of the wires in each rope, strand, or braid, may be of less elastic nature than the other, or may even be made of a non-elastic metal. Steel wire, for instance, may be twisted around iron wire, in such proportion as may be suitable to give the requisite carrying-capacity to the spring, and yet to produce the desired effect in diminishing the vibration, and checking the too sudden reaction.

I am thus enabled to produce, in the place of nests or groups of springs, one independent spring, which has the capacity of a nest or group, and which possesses the important element of friction, and consequent checked reaction. Moreover, in thus forming the spring, another great advantage results, for while in the manufacture of spiral springs in the ordinary way, it is impossible to coil rods of large diameter upon small mandrels without injuriously straining the fibre, braids or rope, of corresponding capacity, may be so coiled, without danger of injuring the material.

Having now described my invention, and the manner in which the same is or may be carried into effect,

What I claim, and desire to secure by Letters Patent, is—

1. A spiral spring, for railroad-cars, and other purposes, made of a metallic rope or strip, composed of strands of wire, braided or twisted together, substantially in the manner shown and set forth.

2. A spiral spring, for railroad-cars, and other purposes, composed of strands of wire, of different elasticities, or of elastic and non-elastic strands, braided or twisted together, substantially in the manner shown and set forth.

In testimony whereof, I have signed my name to this specification, before two subscribing witnesses.

F. W. RHINELANDER.

Witnesses:

JAMES D. BUTMAN,
ROBT. B. CAMPBELL.