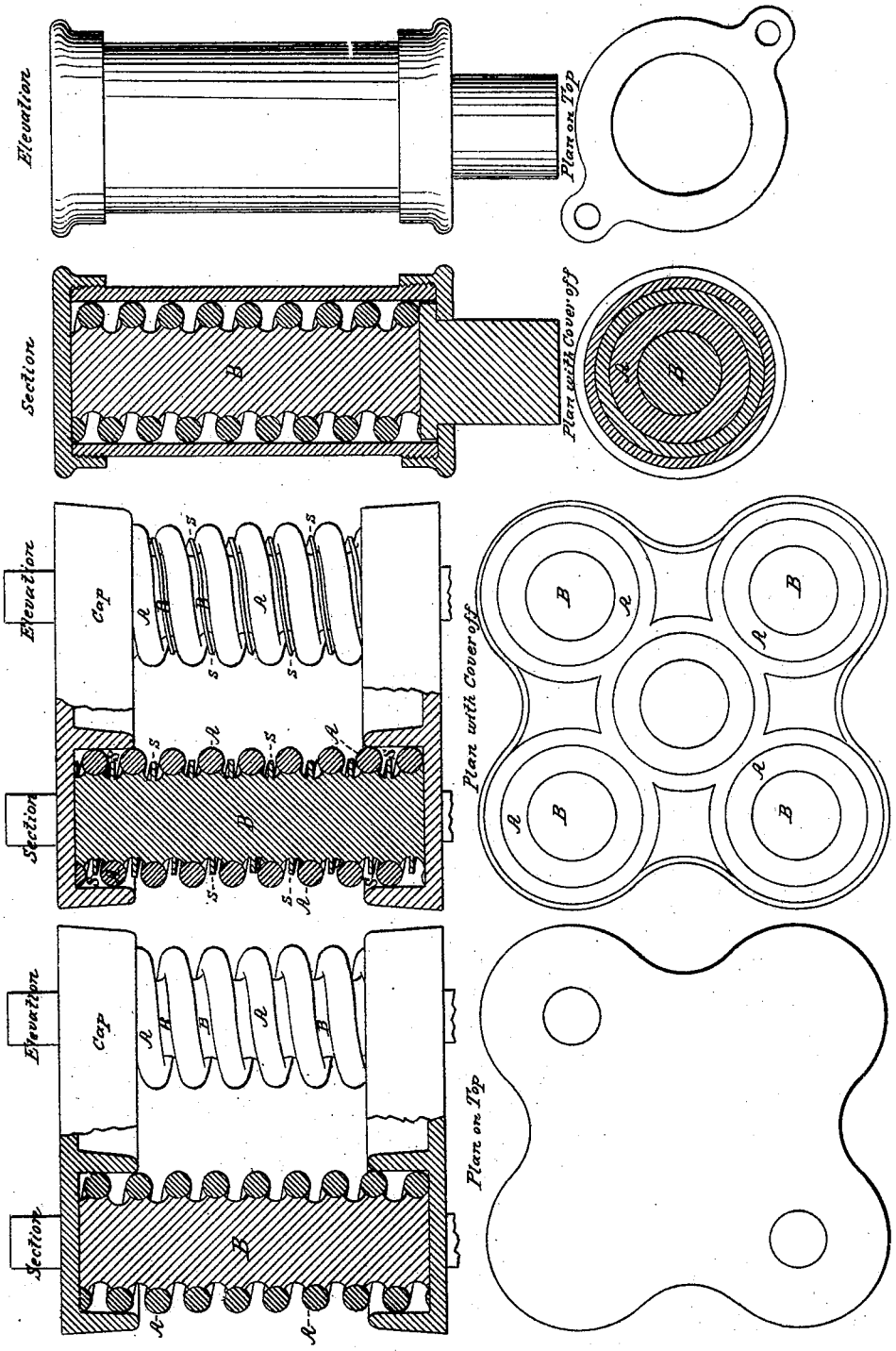
R. VOSE.

Car Spring.

No. 51,368. Patented Dec. 5, 1865.



Witnesses:

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atty

UNITED STATES PATENT OFFICE.

RICHARD VOSE, OF NEW YORK, N. Y.

IMPROVEMENT IN CAR-SPRINGS.

Specification forming part of Letters Patent No. **51,368**, dated December 5, 1865; antedated November 20, 1865.

To all whom it may concern:

Be it known that I, RICHARD VOSE, of the city, county, and State of New York, have invented a new and Improved Combination Rubber and Steel Spiral Spring for Railroad-Cars and other Vehicles; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 represents, by an elevation partly in section, my improved springs as arranged in a group and properly capped. Fig. 2 presents a similar view of my springs, showing a modification of form in the india-rubber center differing from that illustrated in Fig. 1. Fig. 3 is a section, and Fig. 4 an elevation, of a single spring capped and arranged to be used alone, Figs. 5 and 6 being plans of the same with the cover off and on. Fig. 7 is a top view of the incased springs illustrated by Figs. 1 and 2, illustrating the form of the casing; and Fig. 8 is a top view of these springs with the upper cap removed, so as to show more clearly the mode of combining them in groups.

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

The nature of my invention consists in so combining a rubber center or core within an encircling metallic spiral spring as that the rubber shall adhere and be firmly united to the coils of the metallic spring; and it relates also to one mode of obtaining this result by curing the rubber while in contact with the metallic spring.

In all forms of combination-springs having a rubber core or center surrounded by a metallic spiral coil heretofore made use of, the india-rubber and metal have been left entirely distinct from each other, the two parts of the compound spring being each made separately and then placed in juxtaposition, the finished india-rubber column being inserted within the perfected spiral spring. In the compound springs thus made the action of the india-rubber and of the metallic coil, although mutually auxiliary, is in each case independent, the elastic movements of the rubber being distinct and by no means coincident with those of the metallic spring.

Now, I have found by experiment that the power and efficiency of such a combination will be very materially increased by uniting and binding the india-rubber core to the coiled metalic bar along its entire length, so that the two shall become as one piece and produce a single solid spring, combining in one the distinct peculiarities of the two elements or substances which compose it.

In manufacturing my improved springs I first form the metallic coil A of iron or steel, in the usual manner, but of a temper several degrees higher than is required in the finished spring, and which is regulated by the conditions of the after-process for curing the rubber in combination therewith. Within the metallic coil thus formed and tempered I insert a column of raw india-rubber, B, or its equivalent in gutta-percha which has been properly sulphurized according to any of the well-known formulas, (I prefer Goodyear's,) and which is spirally grooved and left of such a diameter as that it will touch the inner surface of the coil along its whole length, as seen in the section shown in Figs. 1 and 2 of the drawings, and then submit the whole to the action of heat until the india-rubber gum has become thorougly baked and vulcanized. By this process the india-rubber, being cured while in contact with the metallic coil, will become firmly cemented thereto.

The temper of the metallic spring, made purposely high in its manufacture, will, if properly graduated, be reduced by the heat required to vulcanize the rubber to that degree best adapted for efficiency in use.

Instead of cementing the rubber and steel together by curing the one in contact with the other, they may be united by some suitable and adhesive cement, and the change in the temper of the metal after the spiral coil has been formed be thus avoided; but I prefer the mode first described of forming the spring as being productive of the best results.

The rubber center should be molded with a spiral groove upon its exterior surface, which should have the same pitch as the coils of the metallic spring, as illustrated in the sectional views thereof seen in Figs. 1 and 3 of the drawings, and be so placed within the metallic spring as that the grooves in the rubber shall coincide with the intervals between the metallic coils, as seen in the drawings. Otherwise the india-rubber, when compressed, would be forced out between the coils and perhaps check their play,

As it is desirable that there should be some packing, however, between the metallic coils, to prevent the contact of steel against steel, a projecting fin, *s*, Fig. 2, may be left projecting centrally from in and along the spiral groove of the india-rubber center, so as to extend out partially between the metallic coils, as seen in Fig. 2; or else the spiral groove in the rubber may be formed large enough to receive the metallic coil without embracing it closely, leaving the thread separating and defining the groove in the rubber to project slightly between the coils.

In its operation my compound spring thus constructed is found extremely effective, and the combined action of the steel and rubber thus intimately united will be found to yield most perfect resilient power.

Although the central core or column of rubber may be used solid, I prefer to have a central aperture pierced longitudinally through the same.

And now, having thus fully described my invention, what I claim therein as new, and desire to secure by Letters Patent, is—

1. The combination of an india-rubber column with the interior of a spiral spring of metal, when the rubber and metal are cemented together along the entire length of the metallic coil, substantially in the manner and for the purpose herein set forth.

2. The use, in connection with the interior of a coiled metallic spring, of a central column of india-rubber, spirally grooved, substantially as and for the purpose herein set forth.

The foregoing specification of my improved spring for railway-cars and other vehicles signed by me this 15th day of March, A. D. 1865.

RICHD. VOSE.

In presence of—
A. L. BUTLER,
WILLM. TOSHACK.