P. G. GARDINER.

Car Spring.

No. 37,862. Patented Mar. 10, 1863.

Fig. 1

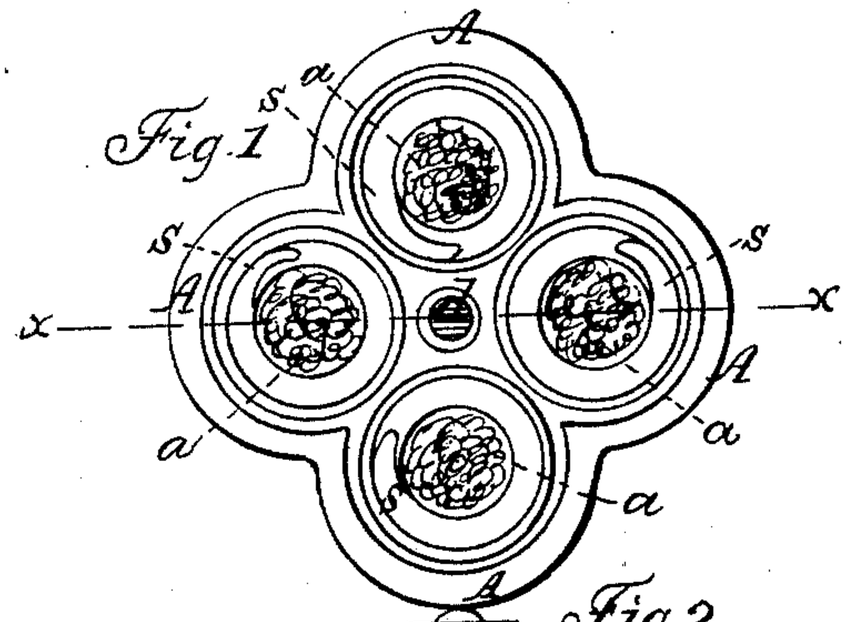


Fig. 2.

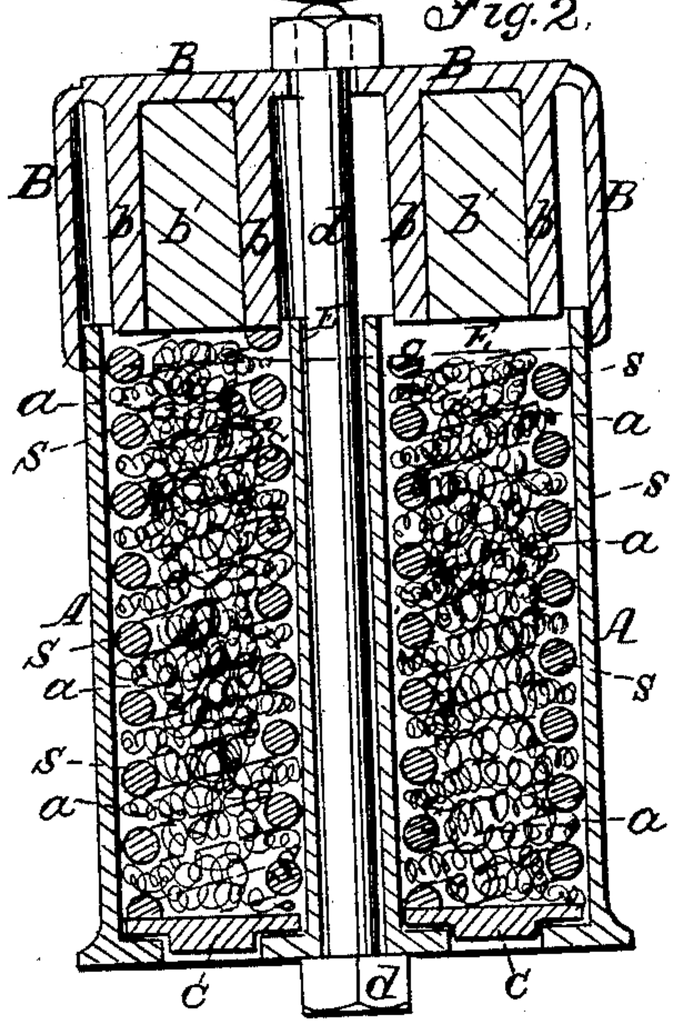


Fig. 3.

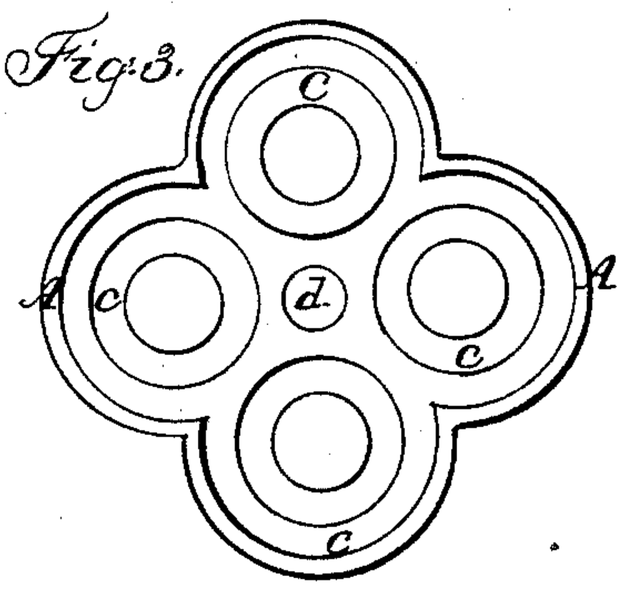
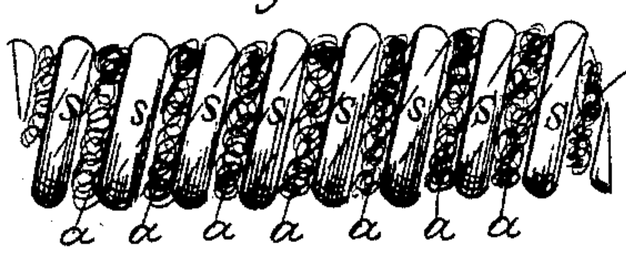


Fig. 4



Witnesses;
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UNITED STATES PATENT OFFICE.

PERRY G. GARDINER, OF NEW YORK, N. Y.

IMPROVEMENT IN RAILROAD-CAR SPRINGS.

Specification forming part of Letters Patent No. **37,862**, dated March 10, 1863.

To all whom it may concern:

Be it known that I, PERRY G. GARDINER, of the city of New York, mechanical engineer, have invented certain new and useful Improvements in Springs for Railroad-Cars; and I do hereby declare that the following is a full and exact description of my said invention and improvements, reference being had to the drawings accompanying and making part of this my specification, and to the letters of reference thereon.

My invention consists in the manner of using and applying the elastic and compressible qualities of natural or raw wool, in combination with springs of steel in a spiral or circular frame and operating together in a cell or cells, so as to form a spring sufficiently strong, durable, and elastic for railroad-cars. Other animal or vegetable fibrous substances —such as hair or cotton—may be used and combined and applied in a similar manner; but I consider wool as the most durable and elastic, and, in general, the best of any material capable of being used and applied according to my invention.

In the accompanying drawings, Figure I represents in horizontal cross-section the cells or case, the spiral steel springs, the wool packed or compressed within the spirals, and the bolt which holds the sliding top or cover of the spring upon the body of the spring itself, the cross-section being made at the line where the cover rests upon the body of the spring. Fig. II represents a vertical cross-section of the spring through the part indicated by the line *x x* in Fig. I. Fig. III shows the base or bottom of the case or cells in horizontal cross-section. Fig. IV represents the spiral spring with the wool packed or compressed therein and detached from the cell or case.

In all the figures the same letters represent the same parts.

My spring is constructed in manner following: I place the operating parts of the spring within a cast-iron shell or case, and which case has a cover or top, B, which shuts over the body thereof, and slides upon it to give the required play or action of the spring. This shell or case A consists of a group of cells or chambers in the form of hollow cylinders (usually four in number) united together in one casting, so as to resemble a group of columns, the shape of which is shown in horizontal cross-section in Figs. I and III. I construct steel spiral springs *s s* of a size just sufficient to fill the cells and work freely, each within its own cell. These steel spirals should be made upon a mandrel very slightly conical or tapering from the base, as well for the the purpose of being easily disengaged from the mandrel as for allowing a slight recess or space between the upper exterior surfaces of the spirals and the corresponding interior surfaces of the cells within which they are made to operate. The inside diameter of the coils for journal-springs for ordinary cars is about three times the diameter of the wire composing the spring, and the size or diameter of the wire composing them is about three-eighths of an inch; and I think that a good proportion of the diameter of the coil to the diameter of the wire composing it is as three to one. I do not consider that these precise dimensions are indispensable, but variations may be admitted according to the circumstances and conditons required. Into the hollow part or central space of these spirals I pack the wool, (or other fibrous elastic material,) as shown at *a a*, Figs. I, II, IV in brown colors. The wool best adapted to this purpose is the long-fiber coarse wool—such as Buenos Ayres wool—and requires no other preparation than being washed or cleansed so as to free it entirely from dirt. It should be as free as possible from moisture when put into the spring.

While packing or compressing the wool into the spring, the spring should be held firmly within a hollow cylinder or a vice with circular jaws so as to surround it. The wool should then be forced in by a follower or rammer, by pressure, or by blows, and it would be best to have the wool passed into the spring through a tube of the size of the hollow of the spring to be filled. It should be forced and compressed into the hollow of the spiral so as to fill it completely, but should not be permitted to bulge out of the exterior line of the coils, as this would interfere with the action of the spiral spring within cell, and create friction and clogging between it and the interior surface of the cells. The quantity of wool to be forced into the hollow of the spiral should be about as much as it will bear to have forced into it and not rise above the top of the spiral,

These spirals, being thus firmly packed and filled with the wool, are placed in the cells, as shown in Fig. II.

The plate or base *c* is a flat disk of iron to form a base, and close the openings in the bottom of the cells, which are made merely for convenience in inserting the cores of the castings.

It is to be observed that these spiral columns are not all to be of equal height, but they may be all different, or two may be of the same height and the other two of less height, as shown in Fig. II at *e e*, the object of which arrangement is to have only a part of the number of columns of spirals in action when the load is light, the others coming into action as the load increases; in other words, to graduate the action of the resisting elastic force according to the load. This is effected by means of the arrangement of the interior parts of the cap or cover B, Fig. II. This cover is of cast-iron and shuts down over the lower case, so as to fit very accurately and slide easily upon it. It has hollow cylinders *b b*, all of equal dimensions and corresponding to the number of spiral springs cast upon the interior surface of the top, and projecting downward directly over the corresponding spiral columns beneath. These cylinders are made hollow for the purposes of lightness and economy, and their hollow spaces are filled by plugs of wood *b' b'*, Fig. II. These projections and plugs constitute the followers by which the spiral columns are acted upon by the load, and their length will correspond to the amount of action or play given to the spring. A screw-bolt with head and nut is inserted through the center, as shown at *d d*, by which the cover and body of the spring are kept adjusted together.

This manner of combining the wool and the steel spring does not permit the wool to wear or cut to pieces, or lose its elastic and vital force, and the spiral steel spring holds it in column and in a sufficiently solid form to allow its force and lively action, and at the same time to afford sufficient elastic resistance to the load, while it also aids the spiral in its elastic active properties, the whole being supported and arranged by and into a neat, compact, and beautifully-shaped spring by means of the group of columns constituting the case and the cover. The access of dirt and dust and other matter likely to destroy or impair the vitality of the wool is effectually guarded against.

The springs of the dimensions herein given are adapted to the journals of the ordinary passenger-cars upon American railroads having eight wheels, there being a spring attached to each journal-box. These springs may also be used wherever desired for body-springs.

I am aware that the application of wool, cotton, and other vegetable and animal materials as elastic agents is not original with me; nor do I claim the use of such as my invention, but only the manner in which I apply them in combination with the steel springs, and the combining them with the case in cells and in the column form. Owing to the remarkably soft and easy action of the springs thus constructed, I call them, for the sake of distinction, the "cushioned steel springs."

Having thus described my invention and improvements and the manner of constructing the same, what I claim therein as my invention, and for which I desire Letters Patent, is—

1. The manner of applying the wool (or other fibrous materials) within a spiral or circular steel spring so as to hold the wool in a columnar form and compressed to a sufficient degree of compactness to act as a spring itself, and also aid and strengthen the spiral spring at the same time and hold it in a straight line.

2. The peculiar construction of the followers *b' b'* in being composed of a wooden plug within the hollow cylinder, thereby producing lightness and economy.

3. In combination with the other parts of the spring, the manner of giving a progressive or increased elastic resistance according to the increase of the load, by making the columns constituting the springs of different heights, as described.

P. G. GARDINER.

Witnesses:
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