

J. TRENT.  
Car Spring.

No. 103,944.

Patented June 7, 1870.

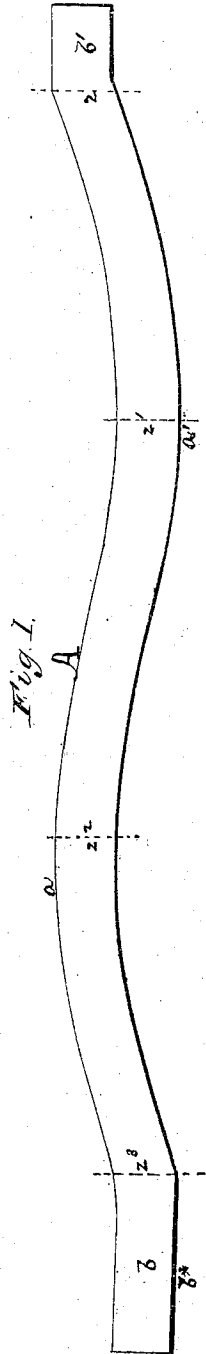


Fig. 3.

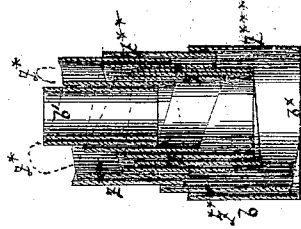
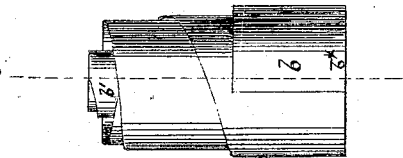


Fig. 2.



Witnesses:  
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# United States Patent Office.

JOSEPH TRENT, OF MILLERTON, NEW YORK.

Letters Patent No. 103,944, dated June 7, 1870; antedated June 1, 1870.

## IMPROVED VOLUTE SPRING.

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

To all whom it may concern:

Be it known that I, JOSEPH TRENT, of Millerton, in the county of Dutchess and State of New York, have invented a new and Improved Coiled or Volute Spring; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing which forms part of this specification.

This invention relates to an improvement in that class of volute springs which is formed by coiling or rolling up a strip or plate of metal of a certain definite form, and I will here remark that the quality of the spring depends entirely upon the shape of the strip or plate so coiled; hence the difference in the external appearance of the made up springs, and the sustaining powers thereof is due to the shape of the plate used to form the springs, and, therefore, each spring has its own peculiar characteristics, and differs in a material and practical degree from others of the volute class.

My present invention consists in an improved coiled or volute spring, made by coiling or rolling up a strip or plate of metal, of a serpentine or wave-like outline, the convex edges facing in opposite directions, as will be hereinafter more particularly explained.

In the accompanying drawing—

Figure 1 is a side elevation of a strip or plate of metal used in constructing the improved spring which forms the subject of this application for Letters Patent.

Figure 2 is a side elevation of a spring, constructed according to this invention.

Figure 3 is a vertical central section thereof.

*a* designates the bar or plate of metal used in the construction of the spring shown in fig. 2.

The contour of this plate is serpentine or wave-like, the convex edges *a a'* facing in opposite directions.

I preferably terminate the plate with legs, *b b'*, and provide one of the legs, *b*, (if not both,) with straight or horizontal edges, as shown at *b\**, so that, when the plate is coiled into a spring, the said edge *b\** will constitute a level base on which to rest the spring, and, in such case, the leg *b'* will constitute the core of the spring.

The plate or bar can be cut or stamped out of a plate or sheet of steel, several at a time, in the usual or any suitable manner, and coiled around a mandrel

or by a coiling-machine, when the spring represented by fig. 2 will be produced.

It is evident that the plate or bar may be provided with more than two curves or waves, and, when so provided, a more powerful spring will be produced, and, when a plate with more than two curves is employed, the convex edges I preferably cause to face alternately in opposite directions. And I will here remark that the character of the spring will be changed according to the number of curves. For illustration, the plate shown in fig. 1 gives us, strictly speaking, a triple volute spring, as will be at once seen from the following statement of the operation of the coils.

Refer to fig. 1. From the dotted line *z* to the line *z<sup>1</sup>* we have a series of coils running downward, as shown at *z\**, fig. 3; from the dotted line *z<sup>1</sup>* to the line *z<sup>2</sup>* we have a series of coils running in an upward direction, as shown at *z\*\**, fig. 3; and from the dotted line *z<sup>2</sup>* to the line *z<sup>3</sup>* we have another series of coils running in a downward direction, as shown at *z\*\*\**, in fig. 3; hence we have three distinct series of coils, and so, therefore, when the spring is compressed, one series of coils is closing together in one direction and two series are closing together in an opposite direction, and, at the same time, all the series act in concert.

These three series of coils gives us a spring possessing the sustaining power of three single volute springs combined in one spring. And, in like manner, when a plate having three curves is used, we have four series of coils, two running in one direction and two running in an opposite direction, and thus we obtain, strictly speaking, a quadruple volute spring, inasmuch as there would be four single volute springs combined in one spring, and, in this manner, we may go on and produce quintuple, sextuple, &c., springs in accordance with the number of curves with which the serpentine plate or bar is provided.

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

As a new article of manufacture the coiled or volute spring made of a serpentine or wave-like plate or bar of metal, substantially as herein set forth.

JOSEPH TRENT.

Witnesses:

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