

(No Model.)

E. CLIFF.
CAR SPRING.

No. 457,074.

Patented Aug. 4, 1891.

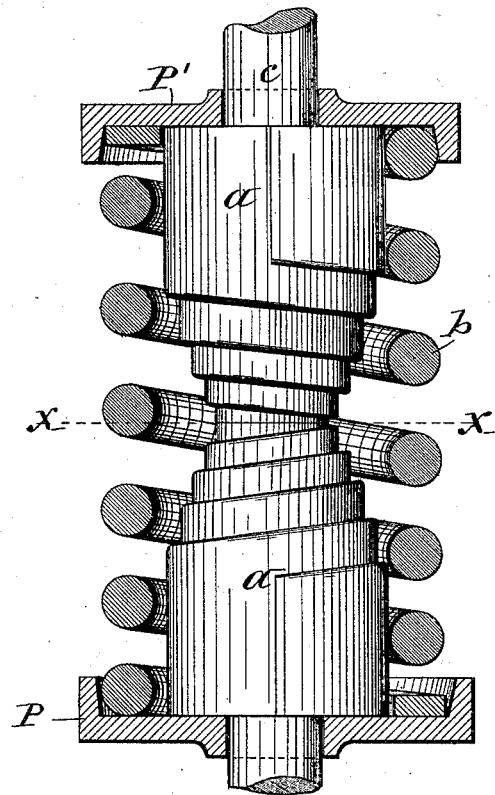


Fig. 1

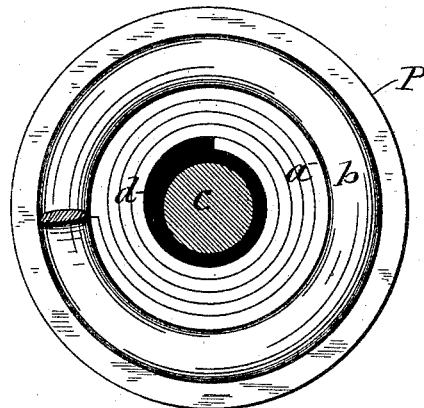


Fig. 2

WITNESSES:

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EDWARD CLIFF, OF NEWARK, NEW JERSEY.

CAR-SPRING.

SPECIFICATION forming part of Letters Patent No. 457,074, dated August 4, 1891.

Application filed January 7, 1891. Serial No. 376,970. (No model.)

To all whom it may concern:

Be it known that I, EDWARD CLIFF, of Newark, in the county of Essex, in the State of New Jersey, have invented new and useful

5 Improvements in Car-Springs, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention is designed more especially
10 for elastically supporting the body of a street-car or railroad-car on the truck thereof, and is a specific improvement of the class of car-springs in which one or more springs are nested within a larger spiral spring.

15 My present improvement consists, essentially, of a car-spring composed of a spiral spring and volute springs, which latter are placed endwise one upon the other inside of the spiral spring, thus combining with a sensitive outer springs slower-acting inner springs, which together form a car-spring of superior efficiency and durability in its operation.

The invention also consists in novel means
25 of securing the volute springs in their concentric position in relation to the outer spiral spring, all as hereinafter more fully described, and set forth in the claims.

In the annexed drawings, Figure 1 is partially a side view and sectional view of a car-spring embodying my improvements, and Fig.
30 2 is an end view of the same.

Similar letters of reference indicate corresponding parts.

b represents a spiral spring, which may be
35 formed either of a round or oval or square or other shaped bar, and may be either conical or cylindrical in shape, and may also be graduated in any of the usual and well-known forms, if desired.

40 *aa* represent two volute springs, which are placed with the small end of one upon the small end of the other and inside of the spiral spring and axially concentric therewith, and are normally of the same height. It is a
45 well-known fact that a spiral spring is more sensitive than a volute spring of the same weight, owing, chiefly, to the frictional contact between the convolutions of the latter spring and the disposition of the metal in relation to the direction in which its resistance
50 is utilized. Hence by combining this volute spring with the more sensitive spiral spring the latter becomes re-enforced, so as to produce a car-spring of proper elasticity and
55 great durability.

The described compound spring is mounted on the usual base-plate *P* and provided with a cap *P'*, of similar form, and through eyes in the centers of said plate and cap and longitudinally through the axes of the volute
60 springs *a a* passes the usual bolt *c*.

In order to insure the retention of the two volute springs in proper axial alignment I fill the space between the bolt and small ends of said springs with lead or other suitable
65 metal poured in a melted condition into said space, said filling being shown at *d* in Fig. 2, said close embrasure being undisturbed by the compression of the spring, inasmuch as said compression is from the large end to the
70 small end of the spring.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The improved car-spring consisting of
75 the spiral spring *b* and the volute springs *aa*, placed endwise one upon the other inside of the spiral spring and normally of the same height, as set forth and shown.

2. The combination, with a volute spring
80 and a bolt passing longitudinally through the axis of said spring, of the soft-metal packing *d*, filling the space between the small end of the spring and bolt, substantially as described and shown.

3. The combination of two volute springs
85 *a a*, disposed with the small end of one upon the small end of the other, the bolt *c*, passing longitudinally through the axes of said springs, and the soft-metal packing *d*, filling the space
90 between the bolt and springs at the junction of the latter, as set forth and shown.

4. A car-spring composed of the spiral
95 spring *b*, the volute springs *aa*, disposed with the small end of one upon the small end of the other and both inside of the spiral spring, the bolt *c*, passing longitudinally through the axes of the volute springs, and the supplemental packing *d*, filling the space between
100 the bolt and volute springs at the junction of the latter, substantially as described and shown.

In testimony whereof I have hereunto signed my name this 2d day of January, 1891.

EDWARD CLIFF. [L. s.]

Witnesses:

WM. J. LEECH,
H. FRAZEE.