2 Sheets—Sheet 1.

A. B. DAVIS.

Car-Spring.

No. 211,000. **Patented Dec. 17, 1878.**

Fig. 1.

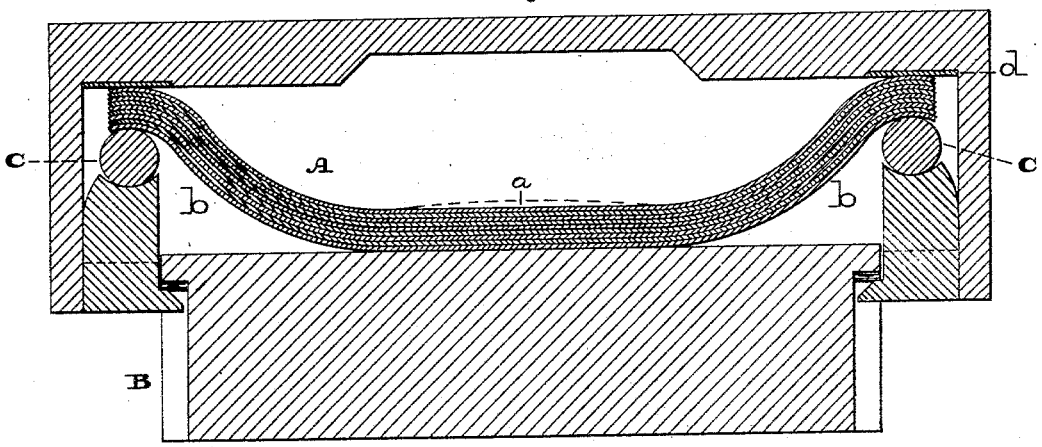


Fig. 2.

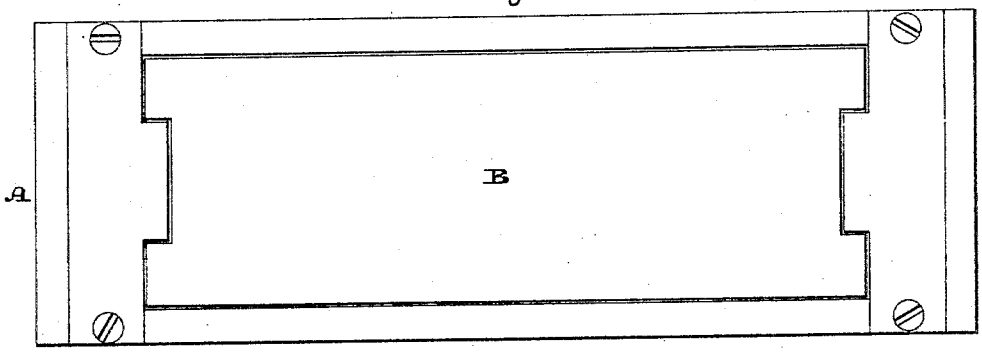


Fig. 3.

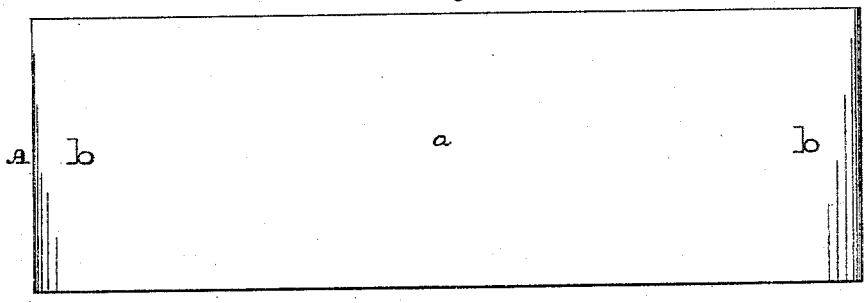


Fig. 4.

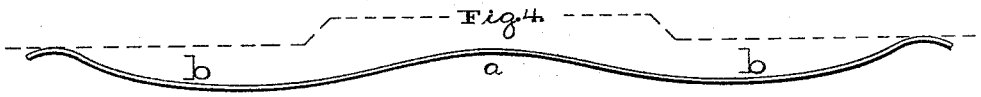
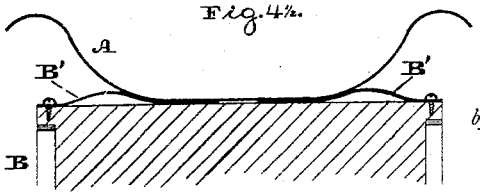


Fig. 4½.



Witnesses:

A. P. Grant,

W. F. Hoicher

Inventor:

A. B. Davis,

by John A. Wiedersheim

ATTORNEY.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

2 Sheets—Sheet 2.

A. B. DAVIS.

Car-Spring.

No. 211,000. Patented Dec. 17, 1878.

Fig. 5.

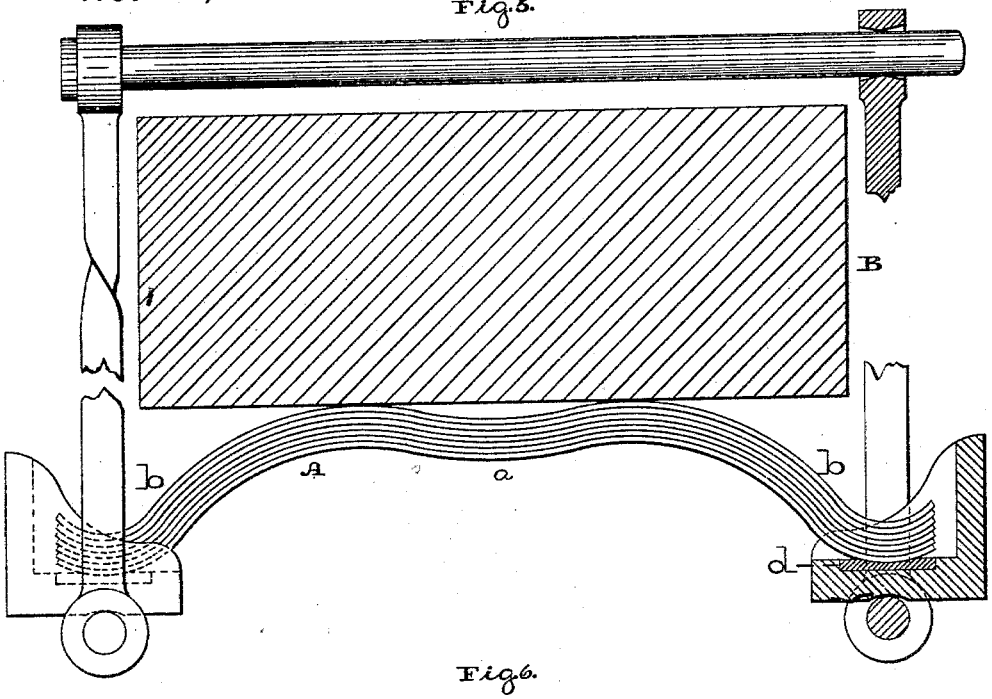


Fig. 6.

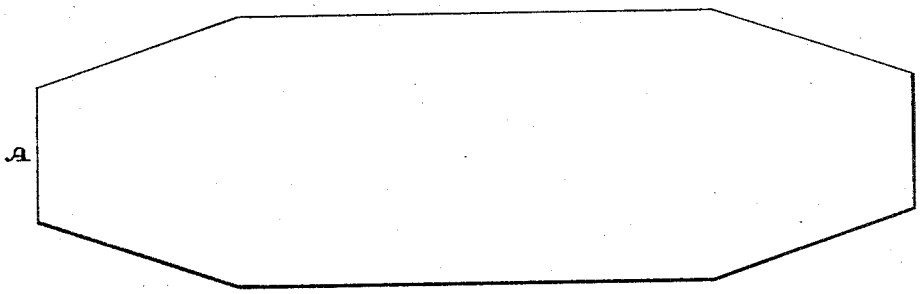
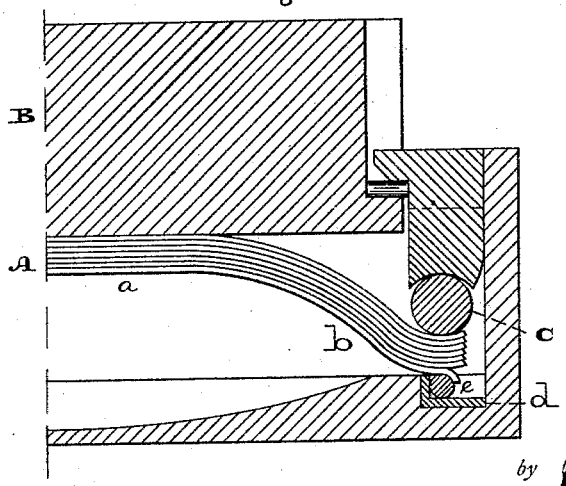


Fig. 7.



Witnesses:

A. P. Grant,

H. D. Kircher

Inventor:

A. B. Davis,

by John A. Wiedersheim

ATTORNEY.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

AUGUSTUS B. DAVIS, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN CAR-SPRINGS.

Specification forming part of Letters Patent No. **211,000**, dated December 17, 1878; application filed October 8, 1878.

To all whom it may concern:

Be it known that I, AUGUSTUS B. DAVIS, of the city and county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Car-Springs, which improvement is fully set forth in the following specification and accompanying drawings, in which—

Figures 1, 5, and 7 are central vertical sections of the spring embodying my invention. Fig. 2 is a top view of Fig. 1. Figs. 3 and 6 are face views of the springs. Fig. 4 is a side elevation of one of the springs, showing the action thereof. Fig. 4½ is a vertical section of a detached portion.

Similar letters of reference indicate corresponding parts in the several figures.

My invention consists in a car-spring composed of a number strips of spring metal of uniform length having unattached elliptical ends and an unconfined middle portion arranged between the upper and lower bearings, the said middle portion being adapted to bow reversely under the load, so as to produce undulating resiliency throughout the spring, which resiliency is unrestrained by stops or fastenings, as hereinafter specified.

Referring to the drawings, A represents a spring, which is constructed of a strip or piece of sheet-steel, or other suitable sheet metal, of the form of an arch with a flattened crown or a right line, or nearly right line, central portion, *a*, with elliptical ends *b b*, as shown in Fig. 1.

The spring may be employed in nests or series, each of equal length, and inclosed in a box provided with a follower, B, as in Figs. 1 and 7, or applied to a swinging bolster, as in Fig. 5, the ends of the spring resting on the top or bottom plates of the box, and the central portion bearing on the follower; or the ends may rest on shoes of the bolster, and the central portion bear on the bolster proper, B, said follower and bolster constituting the fulcrum of the spring.

The spring is shown unloaded in Figs. 1 and 7. When the load is applied the ends of the springs are straightened, and, as the central portion rests disconnected on the follower or bolster, said portion is caused to bow or swell in reversed direction, as shown in Fig. 5 and by the dotted lines in Fig. 1, the central portion of the spring thus becoming elliptical, whereby three ellipses are presented in the length of each spring, and producing resiliency at the previous right-lined central portion of the spring. As the load increases the ends of the springs still more straighten and the bow enlarges, as in Fig. 4.

It will be noticed that as the spring thus straightens and bows it is continually changing its fulcrum or point of contact with the follower or bolster, whereby, by the vibrations of the car, continuous undulating motions are imparted to the spring, the effect whereof is to create and increase resiliency in the length of the spring at periods when such resiliency is diminishing at the place of imposition of the weight.

A spring of this construction is admirably adapted for cars and other purposes. In service its power is preserved. It rides easy. It is simple and inexpensive in construction.

It will be readily seen that a spring made in this manner must be equally resilient throughout its entire length, as the metallic plates are not altered in their thickness, but are used exactly as they come from the rolls, and, consequently, the perfect uniformity of structure is preserved, which greatly reduces their liability of breaking. Moreover, the springs of a series or nest being of uniform length undulate in harmony, so that the wearing-action is uniform at all points.

C represents rollers, of rubber or other elastic material, interposed between the free ends of the springs and bearings secured to the box, whereby the greatest freedom of motion is permitted to said ends, and steel plates *d* are fitted to the box or shoes of the bolster to provide proper bearings for the ends of the springs in their sliding motions. In Fig. 7 the plate *d* is dishing, and receives a steel roller, *e*, on which the ends of the springs are directly mounted, so as to move with ease. The rollers C are also employed for preventing displacement of the springs, especially during shocks and transportation; but the elasticity of said rollers is not depended upon for assisting the resiliency or strength of the springs A. The springs also possess great extent of motion, as the undulating and straightening motions

occur simultaneously, and while the elliptical ends are undulating or rocking the pressure of said ends is exerted double on the central portion of the springs, thus producing great resiliency at said portion.

In Fig. 4½, B′ represents bowed plates, which, secured at their outer ends to the face of the follower, and free at their inner ends, are intended to prevent wear of the outside spring, with which it is in contact. When the springs are pressed down by the weight of the car the plates B′ yield and move inward toward each other, and compensate for the shortening of the spring caused by the center curve, which will slightly draw together the outer ends of the springs.

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

1. A car-spring consisting of a number of unattached strips of sheet metal of uniform length having unattached elliptical ends and an unconfined middle portion arranged between the upper and lower bearings, the said middle portion adapted to bow reversely under the load, so as to produce an undulating resilience throughout the spring, which is unrestrained by stops or fastenings, substantially as described.

2. A car-spring, substantially such as described, consisting of a number of strips of sheet metal unattached at any portion of their lengths, their ends elliptical, and their middle portion, substantially right-lined, arranged between the upper and lower bearings without bolts or other stops or fastenings in restraint of resilient movement, substantially as shown.

3. The combination, with the springs A, of the compensating-plates B′, applied and operating substantially as and for the purpose set forth.

A. B. DAVIS.

Witnesses:
JOHN A. WIEDERSHEIM,
JOHN A. BELL.