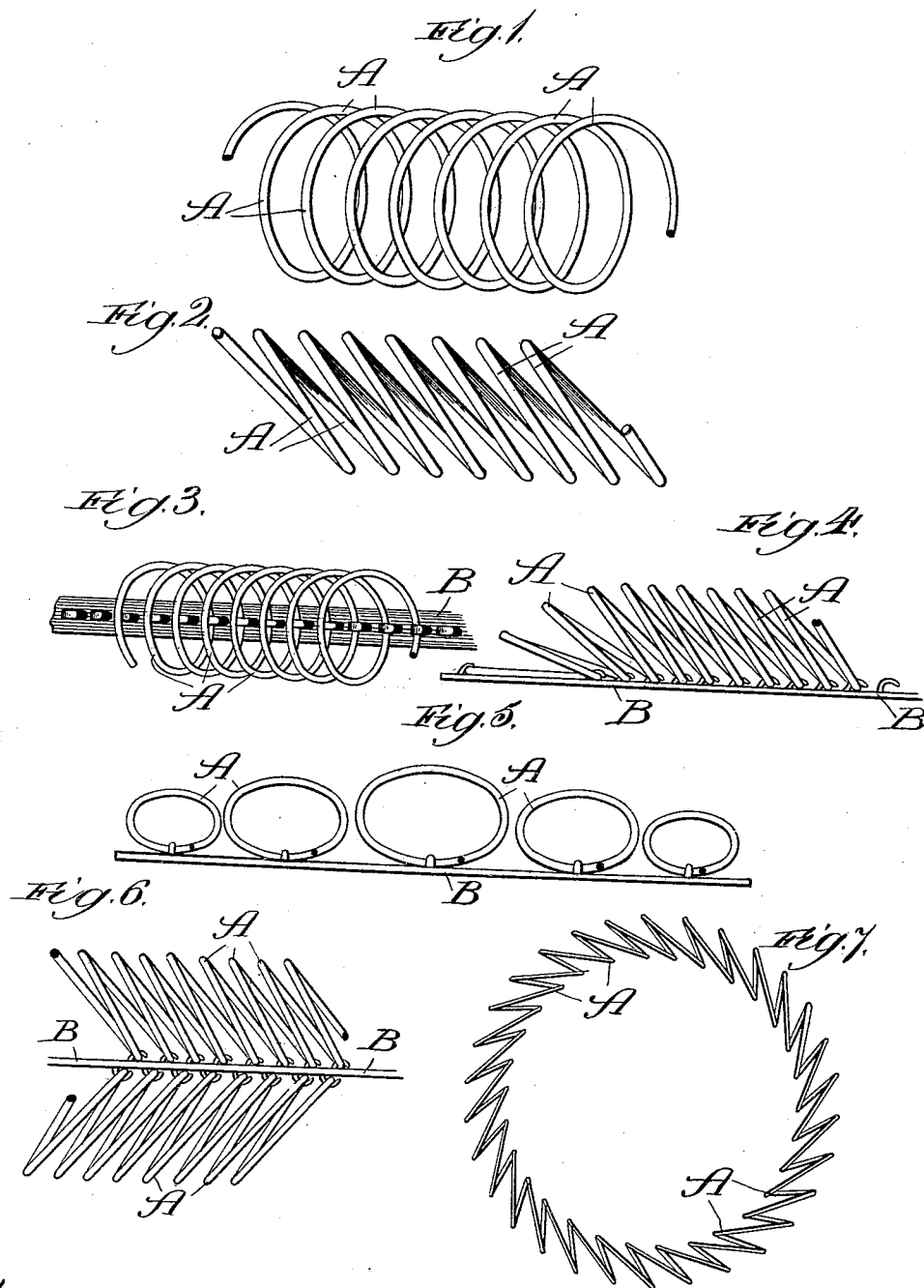


(No Model.)

W. I. BUNKER
SPRING.

No. 488,060.

Patented Dec. 13, 1892.



Witnesses:
Charles Gaylord
Clifford White

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UNITED STATES PATENT OFFICE.

WILLIAM I. BUNKER, OF LA GRANGE, ILLINOIS.

SPRING.

SPECIFICATION forming part of Letters Patent No. 488,060, dated December 13, 1892.

Application filed May 9, 1892. Serial No. 432,311. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM I. BUNKER, of La Grange, Cook county, Illinois, have invented certain new and useful Improvements in Springs, of which the following is a specification.

The object of my invention is to make a series of coiled or spiral springs which are so inclined that when subjected to pressure in cross-section from the top and bottom they will fold one upon the other instead of being crushed or flattened, and thus change the elastic action of the springs from a longitudinal to a transverse direction; and my invention consists in the features and details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a top or plan view of my improved spring. Fig. 2 is a side elevation of the same. Fig. 3 is a top view of my spring attached to a fastening-strip. Fig. 4 is a side elevation of the same. Fig. 5 is an end elevation of a number of springs attached to a strip. Fig. 6 is a side elevation of the two springs attached to a strip between them, and Fig. 7 is a side view of a spring arranged in a circle or endless form.

In making my improved springs I take wire of the desired tension or resiliency and bend it into the desired number of coils, loops, or springs A, but arrange the several springs so inclined that instead of being crushed or flattened under pressure from the top they will lean or fold upon each other. This will be well understood by referring to those figures of the drawings which show the springs in side elevation. To secure this change of elasticity or tension from a longitudinal to a transverse direction under pressure, I preferably lean the coils or springs so that the top of each spring will overlap the bottom of the second ahead of it; but the amount of leaning in the several springs need be governed simply by the fact that they are leaned enough to fold on each other when subjected to pressure from the top instead of crushing, and I simply suggest leaning them to the extent above mentioned as sufficient to secure the result desired. Of course different means may be employed for utilizing this transference of the elasticity or tension of the springs from a longitudinal to a transverse direction.

In Figs. 3 and 4 I have shown the springs

attached to a strip which will enable it to be attached to an article to hold the springs in position to receive pressure from above. For instance, a number of these strips with their springs can be used to form the bottom of a chair, above which can be arranged the seat, so that the pressure from above would be received by the transverse elasticity of the springs, or a number of series of different-sized springs can be arranged as shown in Fig. 5, which presents a view of the end coils of a number of springs attached to a transverse strip. These springs thus attached to strips at suitable intervals can be used as mattress-springs or for other similar purposes; or two series of springs can be attached to an intermediate strip, as shown in Fig. 6, which would double the diameter of the springs subjected to pressure, and thus double or increase the amount of elasticity secured; or the springs can be made, as shown in Fig. 7, in an endless ring or series in shape to be utilized as the tire of a vehicle-wheel. I have simply mentioned these various ways in which springs having their elasticity or tension transferred from a longitudinal to a transverse direction can be applied to various useful purposes, but do not mean to attempt to specify all of the uses to which my improved springs can be applied. Irrespective of the uses, however, to which the springs are to be applied the essential feature of the springs consists in having them leaned or inclined to change the longitudinal elasticity into a transverse direction by the application of pressure.

In the claims I shall speak of the spring being secured to a "base" or "support." By this term I simply intend to mean that I purpose in use to attach the spring to something to hold it in any desired position for use, and for convenience use the term "base" or "support" to indicate the thing, whatever it may be, that the spring is attached to.

I claim—

1. As a new article of manufacture, a spring formed of coils or loops of wire secured to a base or support, the spring having its coils or loops leaned or inclined in the same direction and adapted when subjected to pressure in cross-section to fold one upon the other to change the elastic action of the springs from a longitudinal to a transverse direction, said

springs having sufficient resiliency to resume their normal position when relieved from pressure, substantially as described.

2. As a new article of manufacture, a spring
5 formed of coils or loops of wire secured to a base or support, the spring having its coils or loops leaned or inclined in the same direction and adapted when subjected to pressure in cross-section to fold one upon the other to
10 change the elastic action of the springs from a longitudinal to a transverse direction, said springs having sufficient resiliency to resume their normal position when relieved from pressure and being held in series by a con-
15 nection extending from one to the other, substantially as described.

3. As a new article of manufacture, a spring formed of coils or loops of wire secured to a base or support, the spring having its coils or loops leaned or inclined in the same direction
20 and adapted when subjected to pressure in cross-section to fold one upon the other to change the elastic action of the springs from a longitudinal to a transverse direction, said
25 springs having sufficient resiliency to resume their normal position when relieved from pressure and being united in an endless ring, substantially as described.

WILLIAM I. BUNKER.

Witnesses:

EPHRAIM BANNING,
SAMUEL E. HIBBEN.