

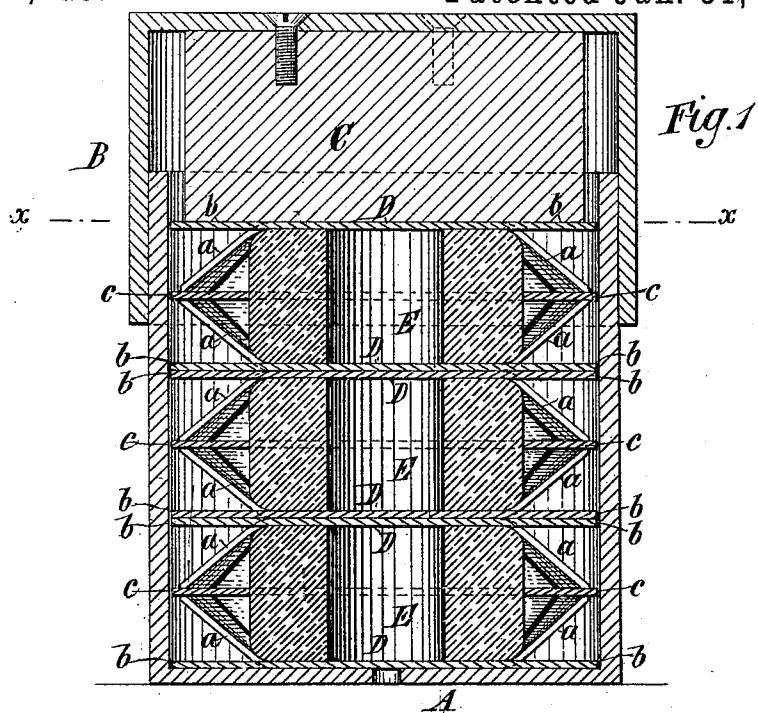
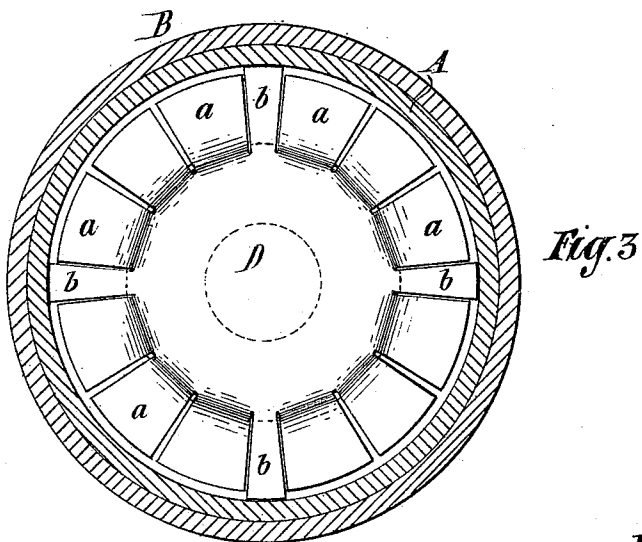
(No Model.)

J. TRENT.

SPRING.

No. 377,125.

Patented Jan. 31, 1888.



Witnesses
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UNITED STATES PATENT OFFICE.

JOSEPH TRENT, OF JERSEY CITY, NEW JERSEY.

SPRING.

SPECIFICATION forming part of Letters Patent No. 377,125, dated January 31, 1888.

Application filed October 3, 1885. Renewed October 28, 1887. Serial No. 253,624. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH TRENT, of Jersey City, in the county of Hudson and State of New Jersey, have invented a certain new and useful Improvement in Springs, of which the following is a specification.

My improvement relates to springs, particularly such as are employed upon railway-cars.

I will describe in detail a spring embodying my improvement, and then point out the novel features in claims.

In the accompanying drawings, Figure 1 is a vertical longitudinal section of a spring embodying my improvement. Fig. 2 is a side view of a metal spring-plate employed therein; and Fig. 3 is a transverse section of the spring, taken on the plane of the line *xx*, Fig. 1.

Similar letters of reference designate corresponding parts in all the figures.

A B designates a shell or case composed of a body portion, A, and a cover, B. This case or shell is shown as cylindrical. It may be made of any desired metal. The cover B is large enough diametrically to extend outside the body portion A and long enough to extend downwardly for some distance about the same. It may move up and down freely about said body.

C is a block, preferably of wood, constituting a plunger. It is secured to the cover B, within the same, by screws or otherwise. As here shown, it is secured by screws passing downwardly through the top of the cover into the block. The block C is of less diameter than the interior of the body A.

D *a b* designate spring-plates of metal, preferably of steel. Inwardly-extending cuts are formed in the edges of these plates. As shown, these cuts are radial. Certain portions, *a*, of the metal between the cuts are bent at an acute angle from the main or body portion D. Other portions, *b*, of the metal within the cuts extend outwardly from the main or body portion and into approximately the same plane therewith. These portions *b* act as guides for the spring-plates when the latter move up and down in the body of the case or shell. These spring-plates may be stamped up out of pieces of sheet metal, if desirable. The portions *a* thereof are resilient. I have shown three

pairs of these spring-plates arranged in the case or shell. They are superposed upon each other, and the plates of each pair are reversed in relation to each other—that is to say, the portions *a* of one plate of each pair extend upwardly and the portions *a* of the other plate of the pair extend downwardly. Of course more or less than three pairs of these springs may be used, if desirable. Between each pair of plates I place friction or bearing rings *c*, preferably of metal. The portions *a* of the plate bear against said rings. Horizontally-extending flanges upon the meeting edges of the portions *a* of the plates might be employed to subserve the purpose of the rings *c*. Between each pair of the spring-plates I place hollow rubber cushions or cores E, constituting springs. These rubber springs bear at each end against the main or body portions D of the spring-plates.

It will be seen that a column of air is confined within each of the hollow rubbersprings, which, when pressed, is brought to bear upon the springs to constitute pneumatic springs. These rubber springs may be omitted, if desired, and when used they of course need not necessarily be hollow. When pressure is applied to the cover B of the case or shell, the plunger C operates to force the springs downwardly. The impact is borne by the rubber springs and the pneumatic springs contained therein, the compression of the air causing the rubber springs to be pressed outwardly at the sides. The portions *a* of the spring-plates are made to act upon the friction or bearing rings *c*, and their resistance is added to that of the rubber and pneumatic springs. It will be observed that as the initial strain is taken by the rubber and pneumatic springs no sudden strain can come upon the metal spring-plates.

It will be seen that the main or body portions of the spring-plates are approximately parallel when disposed in the case or shell, and that the ends of the rubber cushions are also approximately parallel. This is advantageous, because both the steel and the rubber springs may thereby be subjected to more direct vertical strain than would otherwise be the case, and the application of force is therefore more uniform.

A valuable feature of my improvement con-

sists in the fact that in case of breakage or other accident to any of the component parts of the spring the same may be replaced with little trouble and expense. Again, all the parts are
5 protected from the weather by the case or shell, which greatly prolongs the life of the spring.

I am aware that it is old to construct a spring of two plates, each shaped in the segment of a cylinder, and having circular edges
10 so put together that they will bear or touch only at their circumferential edges. A number of these pairs of spring-plates are placed one upon the other in a case or shell, and a
15 bolt passes centrally through them. In this spring a plunger rests upon the top pair of plates. I am also aware that it is old to join several pairs of elliptical springs together at their centers, so that they form radii of a circle, and arrange a rubber cushion between
20 them. A hole extends through the springs and the cushion to accommodate a bolt. It is also old to construct uniformly-concave spring-plates and arrange them in pairs so
25 that a space is left between them. These spring-plates have four arm-like portions which interlock. Between these spring-plates are arranged rubber cushions. Each of the spring-plates and each of the rubber cushions is
30 provided with a central aperture. The springs may be arranged in pairs one upon the other and a bolt passed centrally through them all. It is also old to bolt together a number of leaf-springs having flat central portions and four
35 angularly-diverging arm-like portions, the arm-like portions upon certain of the leaves extending at reverse inclines to those upon other of the leaves. A central aperture extends through all the leaves, through which
40 may be passed a bolt. I do not claim a spring constructed as any of these springs are constructed.

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

1. In a spring, the combination of pairs of
45 spring-plates of metal having solid approximately parallel main or body portions and inwardly-extending cuts upon the edges, certain portions of the metal between the cuts being bent at an angle to the main portions, rubber
50 cushions having approximately parallel ends arranged between said spring-plates, and a case or shell, substantially as specified.

2. In a spring, the combination of pairs of
55 spring-plates of metal having solid central portions and inwardly-extending cuts upon the edges, certain portions of the metal between the cuts being bent at an angle from the main or body portion, hollow rubber
60 springs arranged between said spring-plates, and a case or shell, substantially as specified.

3. In a spring, the combination of pairs of
65 spring-plates of metal having inwardly-extending cuts upon the edges, certain portions of the metal between the cuts being bent at an angle from the main or body portion, a
70 friction or bearing ring between said bent portions, and a case or shell, substantially as specified.

4. In a spring, the combination of pairs of
75 spring-plates of metal having inwardly-extending cuts upon the edges, certain portions of the metal between the cuts being bent at an angle from the main or body portion, guides upon said spring-plates, and a case or
80 shell, substantially as specified.

5. In a spring, the combination of the case or shell A B, the plunger C, rigidly secured to the portion B of the shell, the spring disks or plates D a b, and the hollow rubber springs
85 or cushions E, substantially as specified.

JOSEPH TRENT.

Witnesses:

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