No. 886,052. PATENTED APR. 28, 1908.

R. GREGG.

COIL SPRING.

APPLICATION FILED FEB. 7, 1908.

Fig. 1

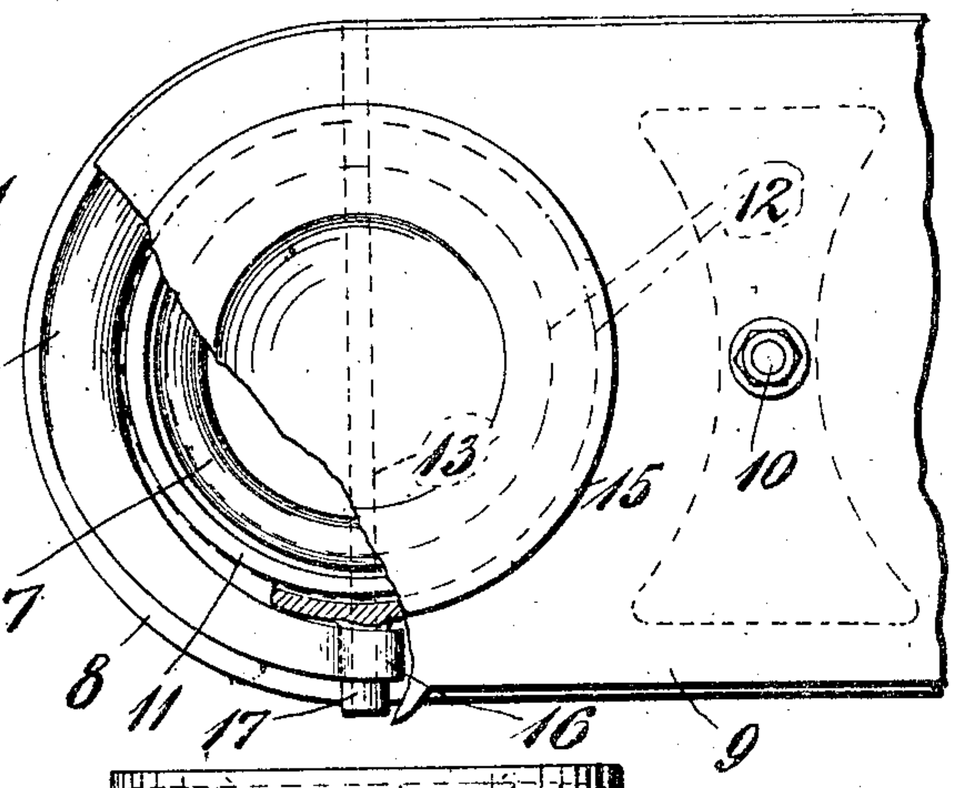


Fig. 2.

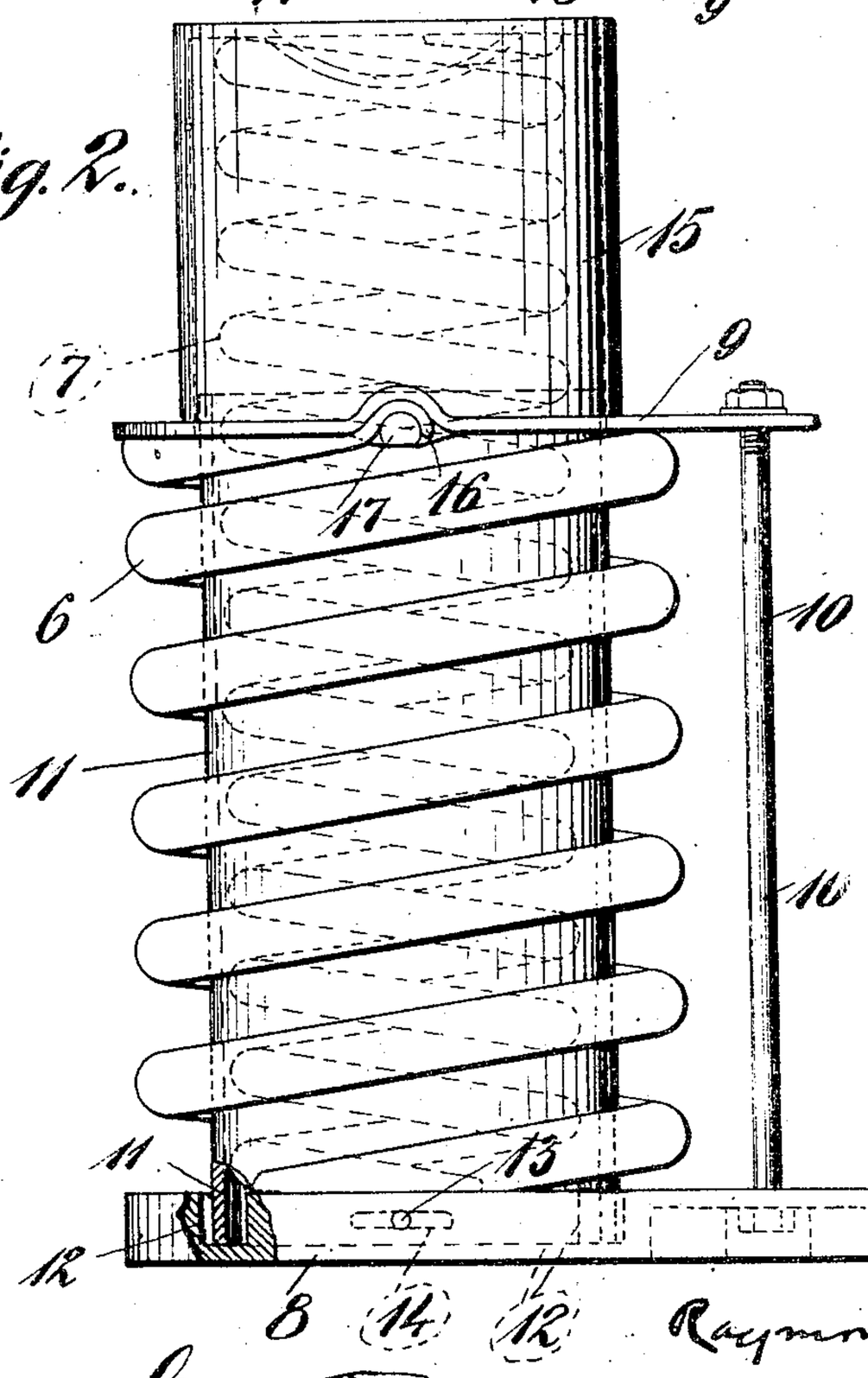


Fig. 3.

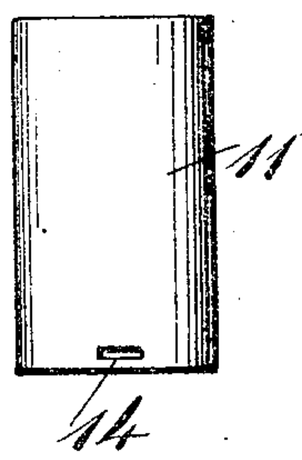
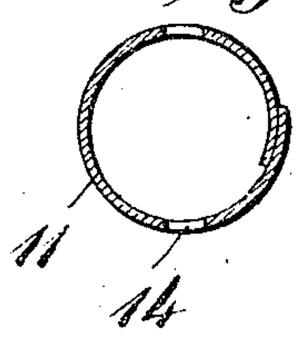


Fig. 4.



Witnesses

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COIL-SPRING.

No. 886,052. Specification of Letters Patent. Patented April 28, 1908.

Application filed February 7, 1908. Serial No. 414,724.

To all whom it may concern:

Be it known that I, RAYMOND GREGG, a citizen of the United States, residing at Hammond, in the county of Lake and State of Indiana, have invented certain new and useful Improvements in Coil-Springs, of which the following is a specification.

This invention relates to coil springs, particularly adapted for use on railway cars, but capable for use on other vehicles; and it consists of an improved device for retarding and controlling the vibrations incident to the springs and to correct several defects peculiar to such springs.

Coil springs, as generally used, are made short or low, and of small pitch, and aside from their ballistic action or tendency, the coils will strike together when compressed, which causes a jar which is transmitted to the car and which forms the chief objection to such springs. Leaf springs are steadier, because the friction between the leaves retards the vibrations, but they are also very much more expensive.

The present invention is designed to reduce or prevent the catapultic action of a coil spring, and make it equal, if not superior, to a leaf spring. This is accomplished by means of a spring steel bushing, split and rolled or compressed to fit within the outer coil, in connection with other devices to be hereinafter described, including means for so connecting inner and outer springs together that the action of both will be controlled or retarded.

The invention is illustrated in the accompanying drawings, in which

Figure 1 is a top plan of a nest of springs, the top plate being partly broken away. Fig. 2 is a partial side elevation thereof. Fig. 3 is a side elevation of the bushing. Fig. 4 is a vertical section.

Referring specifically to the drawings, 6 indicates the outer coils, 7 the inner coils, 8 the base or bottom plate, 9 the cap or top plate and 10 the connecting bolt.

11 is a bushing made of tempered spring steel. It is split up one side and is normally of larger diameter than the inside diameter of the outer coil. It is compressed and inserted between said coil and the inner coil, and it constantly exerts a frictional pressure upon the inner side of said outer coil. The length of this bushing is preferably as great, or greater, than the height of the coil, whereby it exerts its controlling influence throughout the whole height of the coil.

The base 8 and cap 9 are made of malleable iron, and the base has a circular groove 12 in which the lower end of the bushing sits, the groove being wide enough to allow the necessary expansion and contraction of the bushing. The bushing is fastened down or connected to the base 8 by means of a cross pin 13 which extends through the base and through slots 14 in the lower end of the bushing. This feature is important, as will be explained later. The inner spring is somewhat higher than the outer spring, and the cap plate 9 has raised crowns or cups 15 into which the upper end of the inner springs extends. The inside of the cup is large enough to receive the upper end of the bushing, and to allow the cups to work up and down over said bushing. The depth of the cup should equal the sum of the distances between the coils of the outside spring, in other words, the difference between the solid height of the spring and the extended or normal height. This cup makes it possible to have the bushing of as great or greater height than the outer coil.

Means are provided to cause the two springs to coöperate or work together. To this end, the upper end of the outer coil is bent to form a hook as shown at 16, which is engaged in a socket and around a pin 17 formed on the under side of the cap plate 9, and by thus connecting the outer spring to the cap, which also bears upon the inner spring, the latter spring is prevented from impairing the action or effect of the controller or bushing, since both springs must expand or contract at the same time.

It will be noticed that the bushing is as long or longer than the height of the outer spring. Consequently it exerts its effect throughout the whole length of the spring, and not on only part thereof, as with a bushing shorter than the coil. In order for a spring to receive the full restraining influence of a bushing shorter than the spring, the spring would have to be compressed until the coils strike together, a feature which it is most sought to avoid. Also, the bushing in this invention is fastened down, and is thereby prevented from working up and down with the coil, as with loose bushings, which

would decrease or lessen the friction desired to be produced. When the bushing is fixed relative to the spring the greatest possible friction is produced. By connecting the inner and outer coils together the inside coil cannot have the effect of impairing the action of the controller. The inside coil would otherwise have this effect because, being small enough in diameter to work freely inside the bushing, it would have a tendency to act independently and too quickly, which is a defect to be avoided. As explained, the action of the outer coil is restricted by the frictional pressure of the controller thereof. By hooking or connecting the upper end of the outer coil to the cap plate the inner spring cannot expand without also expanding the outer spring; or in other words, both springs are compelled to work together and are consequently controlled by the bushing referred to.

Although illustrated and described in connection with inner and outer coils, the bushing nevertheless is capable of use on springs having a single coil only. The constant friction maintained by the bushing throughout the whole length of the outer spring, as well as the connection between the outer and inner coils which insures their joint actions and control are important features attended with decided advantages in the practical operation of the invention, and makes it much superior to those controllers which retard the action of the spring in one direction only or which fail to operate upon both springs or upon all parts of the outer spring.

I claim:

1. The combination with a coil spring, of a longitudinally rigid and diametrically resilient member arranged within the coil and in frictional contact with the inner surface of the coil along its entire length.

2. The combination with a coil spring, of a metallic resilient member arranged lengthwise within the coil and in frictional contact with the inner surface thereof, the length of the said member being not less than the normal length of the coil, whereby said contact is provided along the entire length of said coil.

3. The combination with a coil spring, of a split spring steel bushing compressed and inserted within the spring, the length of the bushing being at least equal to that of the normal length of the coil.

4. The combination with a coil spring, of a metallic tubular resilient member located within the coil and exerting pressure on the inner surface of the coil along the whole length thereof in all conditions.

5. The combination with a coil spring, and a bearing plate at the end thereof, of a resilient member fastened to the plate and projecting along the coil and in frictional contact with the surface thereof.

6. The combination with a coil spring and a plate against which the end of the spring rests, of a spring-steel bushing fastened at one end to the plate and extending in frictional contact with the surface of the coil.

7. The combination with a coil spring, of a plate against which the end of the spring rests, said plate having a circular groove therein, and a spring-steel bushing fastened at one end in said groove and extending in frictional contact with the surface of the coil.

8. The combination with a coil spring, of plates against opposite ends of the spring, one of the plates having a recess, and a longitudinally rigid and laterally resilient member extending along the full length of the coil and in frictional contact therewith and arranged to project at one end into said recess.

9. The combination of inner and outer coil springs, a controller for one spring, and connections between the springs preventing independent action thereof, whereby the influence of the controller is extended to both springs.

10. The combination of inner and outer coil springs, base and cap plates between which the springs are located, a controller for one of said springs, and a connection between the cap plate and the upper end of the controlled spring, to prevent lift of the plate.

11. The combination of inner and outer coil springs, base and cap plates between which the springs are located, and a resilient member fastened to the base plate and located in frictional contact with the surface of the outer spring, the outer spring being fastened at its upper end to the cap plate.

12. The combination of a base plate, a cap plate above the same, having inverted cup therein, inner and outer coil springs between the plates, the former extending at its upper end into the cup, and a spring steel bushing located within the outer spring and in frictional contact therewith and arranged to project at its upper end into the cup.

In testimony whereof I affix my signature, in presence of two witnesses.

RAYMOND GREGG.

Witnesses:
NELLIE FELTSKOG,
H. G. BATCHELOR.