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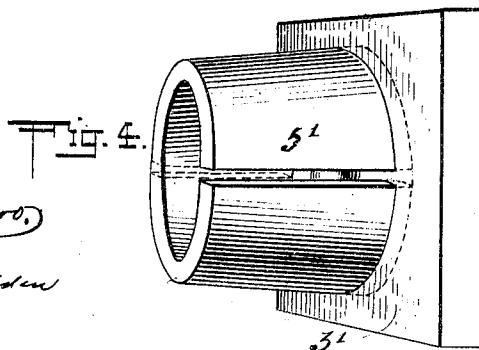
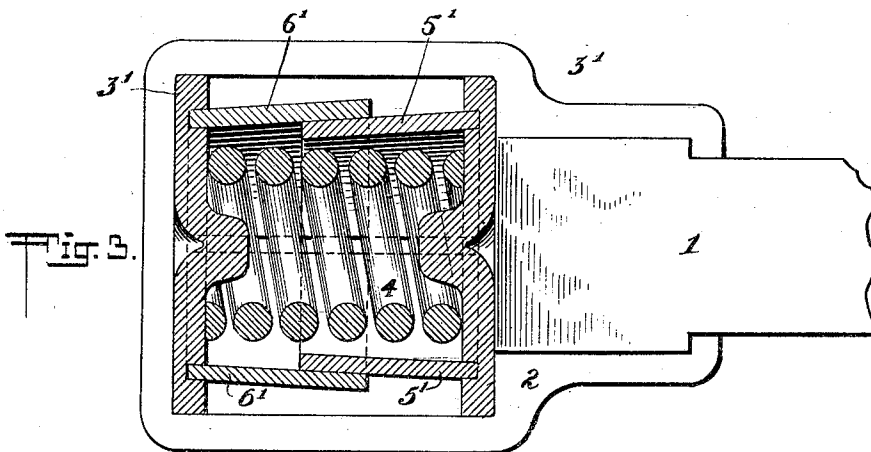
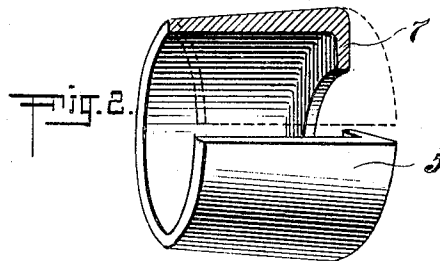
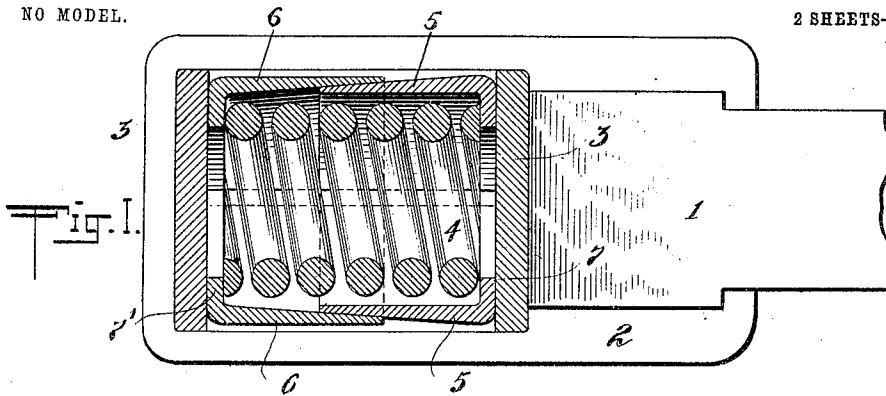
PATENTED SEPT. 13, 1904.

L. A. SHEPARD.
FRICTION DEVICE.

APPLICATION FILED JAN. 23, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



WITNESSES:

Charles F. Lago.
Deion Holden

INVENTOR

Louis A. Shepard
BY
Robt. Robt. Shippin Robt.
ATTORNEYS

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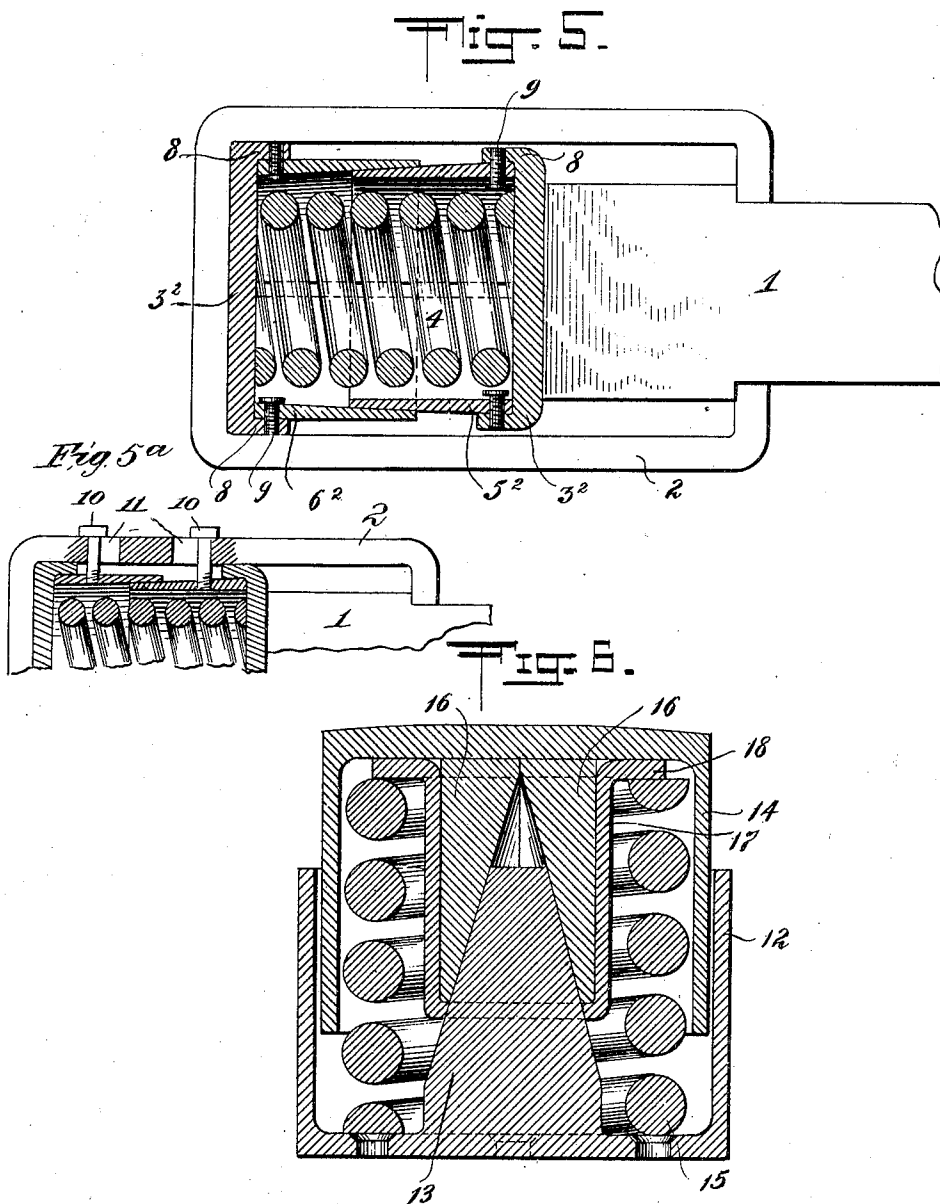
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WITNESSES:

Charles F. J. J.

Delos Holden.

INVENTOR

Louis A. Shepard

BY

Attorneys

ATTORNEYS

UNITED STATES PATENT OFFICE.

LOUIS A. SHEPARD, OF BROOKLYN, NEW YORK, ASSIGNOR TO CORNELIUS VANDERBILT, OF NEW YORK, N. Y.

FRICITION DEVICE.

SPECIFICATION forming part of Letters Patent No. 769,841, dated September 13, 1904.

Application filed January 23, 1902. Serial No. 90,831. (No model.)

To all whom it may concern:

Be it known that I, LOUIS A. SHEPARD, a citizen of the United States, and a resident of the borough of Brooklyn, in the city and State of New York, have invented new and useful Improvements in Friction Devices, of which the following is a specification.

It is well known that a helical or coil spring when subjected to sudden compression or tension ordinarily vibrates a considerable number of times before coming to rest. This is a decided disadvantage when such springs are applied to railway-cars, especially in connection with the draw-bar, as it produces a jerky movement of the car whenever it is suddenly started or stopped, which is unpleasant to passengers. It is very desirable that such a spring should fulfil its function of absorbing, deadening, and minimizing sudden shocks or blows by a single vibration, and in order to act in this way it is necessary that the action of the spring should be deadened or damped in some way. In the operation of a leaf-spring this damping effect is obtained by the friction between adjacent leaves, and on this account the action of a leaf-spring is more satisfactory in this respect than an ordinary helical or coil spring.

The object of my invention is to produce a device or devices which will operate, by means of friction, to absorb and gradually reduce sudden shocks or blows, and, further, to prevent or damp the excessive vibration of a helical spring, if such a spring is used in combination with the frictional resilient elements, and thereby enable it to perform its functions in a much more satisfactory manner.

The devices in which I have embodied my invention are very simple in structure and can therefore be produced at a small cost and cannot become deranged. The frictional elements are resilient, and for this reason combine in themselves both spring and frictional resistance to heavy blows or shocks and are, moreover, self-adjusting for wear. They allow no sudden recoil of the spring, as they act while the spring moves in either direction.

Furthermore, they are especially serviceable and advantageous in that the frictional absorptive and damping effects produced by them increase as the shock which is to be broken increases, thus making them the most effective when most needed.

I will now describe my invention, referring to the appended claims to show the actual scope thereof.

In the drawings which accompany this specification, Figure 1 is a sectional view showing my invention as applied to a draft-rigging. Fig. 2 is a perspective view, partly in section, of one of the friction members shown in Fig. 1. Figs. 3, 5, and 5^a are views similar to Fig. 1 and showing alternative constructions. Fig. 4 is a perspective view of one of the friction members shown in Fig. 3, and Fig. 6 is a sectional view showing one form of my invention as applied to a buffer or supporting spring.

In Figs. 1, 3, 5, and 5^a, 1 represents a draw-bar, and 2 the yoke thereof. In Fig. 1 are shown two follower-plates 3 3, which are of any ordinary form. Between the plates and inclosing the ordinary coil spring or springs are the cooperating members 5 and 6 of my friction device, which in this case are each formed of a single piece of metal, preferably spring-steel, in the form of a split tube flanged at one end to form the bases 7 and 7', respectively, against which the ends of the spring 4 bear. The open ends of these members when in position are telescoped, as shown. Preferably the walls of these tubular pieces are not of uniform thickness; but the thickness of each decreases from its base toward its end, thus causing said members to taper, the sectional area between the exterior surfaces of the inner member increasing toward its base and the sectional area between the interior surfaces of the outer member decreasing toward its base. Thus it is seen that whenever the follower-plates approach each other the member 5 is forced farther within the member 6. This necessitates that the walls of one or both these members shall yield. In the

forms shown in Figs. 1 to 5, inclusive, the walls of the inner member yield inwardly, thus decreasing the sectional area between its exterior surfaces, while the walls of the outer member yield outwardly, thus increasing the sectional area between its inner surfaces. The walls of these members being held at all times in close contact by the resilience of the metal of which they are composed, the movement of the follower-plates is resisted by a constantly-increasing friction. It is obvious that the amount of friction can be regulated by increasing or diminishing the angle or degree of inclination of the tapering members.

In the form shown in Figs. 3 and 4 the resilient friction members 5' and 6' are set into the follower-plates 3' 3' when cast and are firmly held thereby. Each member may be composed of two or more pieces set into the follower-plate, as indicated in dotted lines in Fig. 4. In this form of the invention the walls are of uniform thickness; but they are inclined in such a manner with respect to the follower-plate that the sectional area between the exterior surfaces of the inner member gradually decreases from its base toward its end, while the sectional area between the interior surfaces of the outer member gradually increases from its base toward its end. This is clearly shown in Fig. 3, and this construction will produce the same absorptive and dampening effect as the device shown in Fig. 1. Obviously the degree or amount of friction can easily be regulated by increasing or diminishing the angle at which the walls are set in the follower-plates.

It is evident that instead of using separate plates 3' 3' the friction tubes may be cast integral with the follower-plates. By using a suitable grade of steel for casting the walls of the friction tubes or cups will be sufficiently elastic.

The friction members 5² and 6² (shown in Fig. 5) are secured to the follower-plates 3² 3² by means of screws or other fastening devices 9, which engage lugs 8, integral with the follower-plates. The walls of these members may be either tapered, as shown in Fig. 5, or inclined, as in Fig. 3. Instead of these members being secured to the follower-plates they may be supported independently thereof, as shown in Fig. 5^a, by means of bolts 10 10, which pass through slots 11 11 in the yoke 2.

Another form in which my device may be embodied is shown in Fig. 6. In this case the spring 15 is inclosed by the members 12 and 14, shown in the form of cups, and the friction device is situated within the spring. The member 12, which is preferably a malleable-iron casting, has a tapering portion 13 integral therewith, which bears against the friction bearing-blocks 16 16, which may be of brass. The tubular piece 17 is of resilient material, preferably spring-steel, and is pro-

vided with the flange 18. The walls of this piece are of uniform thickness; but the elements of the interior surface of the blocks 16 converge, and the absorptive and damping effect is practically the same as in the other forms shown except that in this form only one of the coöperating friction members is resilient, while in the other forms both members are resilient. The advantages of this form are simplicity of structure and the fact that there is no frictional wear on the resilient tube 17. The blocks 16 may be readily replaced in case they become greatly worn. Ordinary wear, however, is automatically taken up by the resilience of the tube 17, as is also the case with the other forms shown.

I do not desire to limit my invention to its use in connection with draft-rigging or with a coil-spring, as it may be used in connection with buffing or supporting springs of all kinds and may also be used, if desired, as a buffer or support independently of any spring.

While I have shown the resilient frictional members in the form of hollow tubes, yet the specification and claims are not intended to specify only a device which is circular in cross-section, as obviously the members claimed may be flat, elliptical, square, polygonal, or of any other suitable shape, and the said frictional members may be composed of any number of separate pieces suitably united.

While I have shown a spring as coöperating with the resilient frictional members, yet I wish to be distinctly understood as not limiting my invention to the presence of a spring. Since the frictional members of my device are themselves resilient, the device may be used without any spring, and I believe that I am the first to devise a friction device comprising two coöperating frictional elements, one of which is split and one of which is composed of resilient or spring material.

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

1. A friction device comprising a resilient hollow member having an inwardly-yielding spring-wall, coöperating with a member having an interior converging surface, substantially as described.

2. A friction device having a tapering, inwardly-yielding spring-wall, coöperating with a member having an outwardly - yielding spring-wall whose interior surfaces are inclined toward each other, substantially as described.

3. A friction device comprising a radially compressible, resilient hollow member, coöperating with a member having an interior surface whose elements converge, substantially as described.

4. A friction device comprising a tapering, radially-compressible, resilient hollow member, coöperating with a radially-expandable,

resilient hollow member having an interior surface whose elements converge, substantially as described.

5. As a new article of manufacture, a draft-rigging follower-plate carrying a radially-expansible resilient hollow member, the elements of whose interior surface converge, substantially as described.

6. As a new article of manufacture, a draft-rigging follower-plate carrying a radially-compressible resilient hollow chamber, the elements of whose exterior surface diverge, substantially as described.

7. In a draft-rigging, a member having a yieldingly-supported interior surface whose elements converge, a member having a yieldingly-supported exterior surface bearing against said interior surface, and a spring opposing the approach of said members, substantially as described.

8. In a friction device, a hollow chamber which has a yielding, exterior friction-surface whose elements are diverging straight lines, and a member which has an interior friction-surface whose elements are converging straight lines, substantially as described.

9. In a friction device, cooperating members, one of which has an exterior friction-surface whose elements are diverging straight lines, and the other of which has a yielding, interior, tubular friction-surface whose elements are converging straight lines, substantially as described.

10. In a friction device, two cooperating members, one of which has a yielding exterior friction-surface whose elements are diverging straight lines, and the other of which has a yielding interior friction-surface whose elements are converging straight lines, substantially as described.

11. A friction member comprising a single piece of spring metal in the form of a split tube, the elements of whose exterior surface diverge, substantially as described.

12. A friction member comprising a single piece of spring metal in the form of a split tube, the elements of whose interior surface converge, substantially as described.

13. A device of the character described comprising a series of resilient elements having inclined frictional surfaces, the surfaces on adjacent elements adapted when said series of elements are subjected to compression to be relatively moved through engagement with each other thereby placing said resilient elements under tension.

14. A device of the character described comprising a series of resilient elements having inclined frictional surfaces, adapted when said series of elements are compressed to be relatively moved thereby placing said elements under tension.

15. A device of the character described comprising an expansible resilient element and a

compressible resilient element, said elements having complementary inclined engaging frictional surfaces.

16. In an apparatus of the character described, an open spring element having an inclined frictional surface adapted to be engaged by a similarly-inclined surface to impart tension to the element.

17. In an apparatus for the purpose specified, the combination with an elastic friction element of frusto-conical form, of a frusto-conical part with which it cooperates and whereby it is put under elastic stress when they are forced together, and a spring for separating said parts, substantially as described.

18. In a friction device, the combination with an elastic friction element of frusto-conical form, of a frusto-conical part with which it cooperates and whereby it is put under elastic stress when they are forced toward each other, substantially as described.

19. In a friction device, the combination of a split annular friction element having an inclined frictional surface, and a second frictional element having a correspondingly-inclined surface engaging therewith.

20. In a draft-rigging for railway-cars, the combination with two follower-plates, of a friction device interposed between said follower-plates comprising an elastic friction element having an inclined frictional surface, and a second frictional element having a correspondingly-inclined surface engaging therewith.

21. In a draft-rigging for railway-cars, the combination with two follower-plates, of a friction device interposed between said follower-plates comprising an elastic friction element having an inclined frictional surface, and a second friction element having a correspondingly-inclined surface engaging therewith, and a spring for separating said follower-plates.

22. In a draft-rigging for railway-cars, the combination with two follower-plates, one of said follower-plates having a projecting annular flange, and the other of said follower-plates carrying an expansible friction element adapted to frictionally engage the walls of said flange.

23. In a draft-rigging for railway-cars, the combination with two follower-plates, one of said follower-plates having a projecting annular flange, and the other of said follower-plates carrying an expansible friction element adapted to frictionally engage the walls of said flange, and a spring inclosed within said parts for forcing the follower-plates apart.

24. A device of the character described comprising an expansible resilient split element and a compressible resilient element, said elements having complementary inclined engaging frictional surfaces.

25. A device of the character described com-

prising an expansible resilient element, and a compressible resilient element, said elements being split and having complemental inclined engaging frictional surfaces.

- 5 26. A device of the character described comprising an open split spring element having an inclined frictional surface adapted to be

engaged by a similarly-inclined surface to impart tension to said split spring element.

LOUIS A. SHEPARD.

Witnesses:

A. H. WESTON,
JAMES J. COSGROVE.