Oct. 7, 1947. H. E. TUCKER 2,428,504

FRICTION SPRING UNIT

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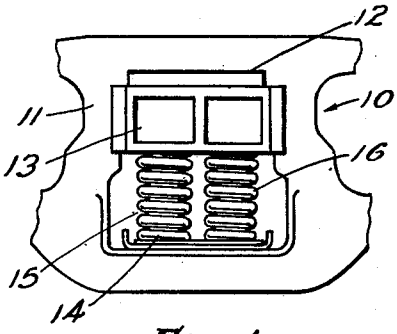


Fig. 1

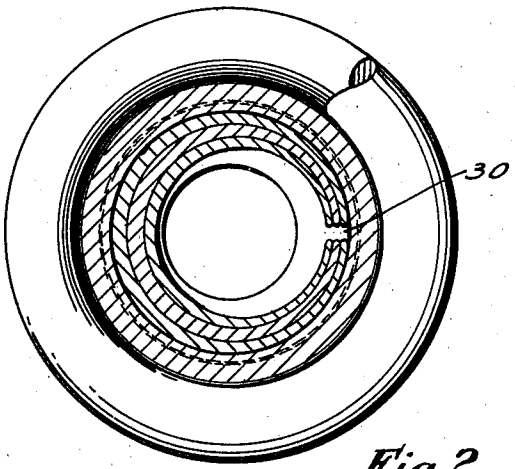


Fig. 2

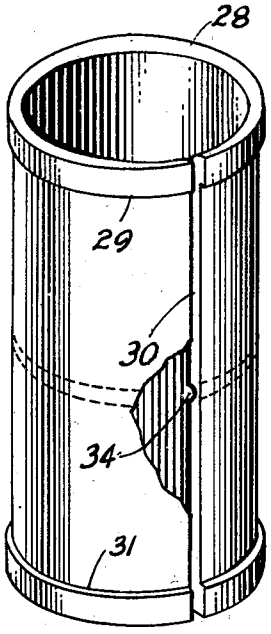


Fig. 4

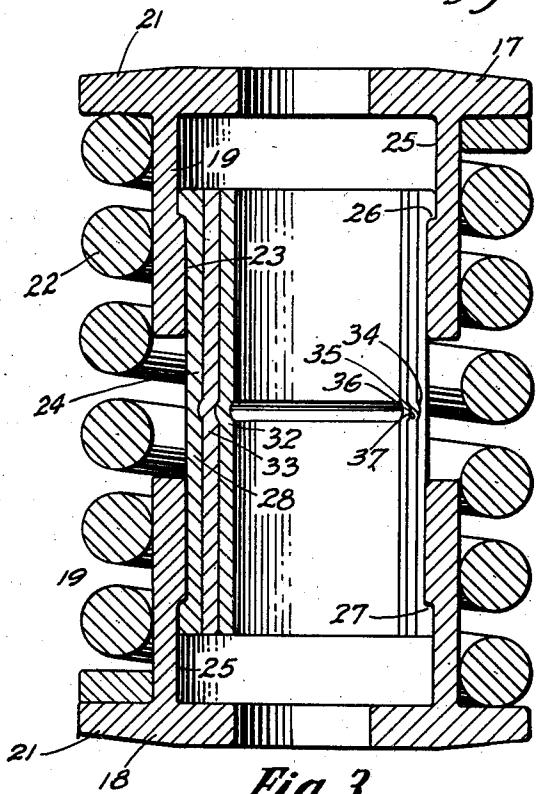


Fig. 3

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FRICTION SPRING UNIT

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8 Claims. (Cl. 267—9)

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This invention relates to railway cars, and more particularly to cushioning devices for railway truck bolsters and the like.

One of the objects of the invention is the provision of a new and improved friction spring unit providing for substantially constant frictional resistance at all degrees of compression of the spring unit and so designed that the magnitude of the substantially constant frictional resistance may be set at various values.

Another object of the invention is the provision of a new and improved friction spring unit adapted to be used in a spring assembly for preventing harmonic action of the assembly.

A further object of the invention is the provision of a new and improved bolster spring unit having parts that frictionally resist both compression and extension, and so constructed that its capacity may be enlarged or reduced with a minimum of time and expense.

A still further object of the invention is the provision of a new and improved spring friction unit that is simple in construction, easily assembled, that is inexpensive to manufacture, and one in which its capacity may be easily and readily increased or reduced at a minimum of time and expense.

Other and further objects and advantages of the invention will appear from the following description taken in connection with the accompanying drawing, in which

Fig. 1 is a side elevation of a portion of a railway truck, showing the invention in position therein;

Fig. 2 is a top plan view of the friction spring unit;

Fig. 3 is a vertical section thereof; and

Fig. 4 is a perspective view of one of the friction sleeves.

Referring now to the drawing, the reference character 10 indicates a truck with parts broken away, having a side frame 11 provided with a bolster opening 12 into which the end of the bolster 13 is adapted to extend, as is usual in such constructions. The bolster is adapted to be supported by a spring assembly 14, comprising the conventional bolster springs 15 and one or more friction spring units 16, as will presently appear. Since the detail construction of the side frame, the bolster, and the bolster springs 15 is conventional it is not thought necessary to further illustrate or describe the same.

The friction spring unit 16 consists of a pair of chambered followers 17 and 18, which are duplicates of each other and each of which com-

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prises a hollow portion 19, preferably cylindrical and having at its outer end a radially extending flange 21 against which is adapted to be seated a spring 22 surrounding the cylindrical portions 19, as clearly indicated in Fig. 3 of the drawing. The cylindrical portion 19 of each follower is preferably, though not necessarily, provided with a cylindrical interior friction wall 23 forming a friction surface which is adapted to be frictionally engaged by a friction member 24 for assisting in resisting the compression of the unit. The interior wall of the cylindrical portion of each follower is enlarged in diameter at its outer end, as at 25, to form the shoulders 26, 27, on the followers.

Suitable means are provided for frictionally engaging the friction surfaces 23 of the followers, and, in the form of construction shown, a friction member 24 is employed for this purpose. This friction member is in the form of a split sleeve 28, which is so constructed that it is normally of larger diameter than the interior of the diameter of the corresponding chamber, so that it must be compressed in order to insert the same into said chamber when the sleeve is in position within the cylinder. The sleeve is flanged at its ends, or the external diameter of the intermediate portion of the sleeve 28 is reduced so as to form the flanges or shoulders 29 and 31, which are adapted to engage the shoulders 26, 27, respectively, on the followers 18 and 19 for limiting the outward movement of the follower during the expansion or extension of the unit.

It will be seen, by means of this arrangement, that whether the unit is being compressed or expanded, there will be friction developed between the outer surface of the sleeve 28 and the external surface of the chambers, and that this friction will be substantially the same in either direction.

Suitable means are also provided for increasing this friction, and in the form of construction shown this is accomplished by providing one or more additional split sleeves which are adapted to nest or telescope within the sleeve 28. For the purpose of illustrating this feature of the invention, two additional sleeves 32 and 33 are employed. It is evident that additional sleeves may be provided if it is necessary to increase the capacity of the unit. Each of these interior sleeves, when normally expanded, has a greater diameter than the interior of the next adjacent outer sleeve, so that each must be compressed in order to place the same in position within the adjacent outer sleeve. As a result of this ar-

rangement the additional sleeves tend to expand the outer sleeve with a greater force, thereby creating greater friction between the outer sleeve and the exterior chambers. In order that the expansion and compression of the sleeves shall be more uniform throughout their circumference, the wall opposite the split, as at **30**, is the thickest and gradually tapers toward the split.

Suitable means are provided for holding the sleeves fixed relative to each other during the operation of the unit. Any suitable means may be employed for locking the sleeves together, but in the form of construction shown the sleeves are provided with ribs and corresponding recesses which are adapted to engage each other for locking the sleeves together. As shown, the outer sleeve is provided with a recess **34** on its inner periphery, which is adapted to be engaged by a rib or corrugation **35** formed in the sleeve **33**. In forming this corrugation in the sleeve **33** a corresponding groove or recess **36** is formed on its interior surface, which is adapted to be engaged by a corrugation **37** formed on the outer surface of the inner sleeve **32**. In forming this corrugation a corresponding recess is formed on the inner sleeve which is adapted to be engaged by a corrugation on the next size friction sleeve, if it is desired to use the same.

In order to increase the capacity of the unit this may be done in two ways: one by increasing the capacity of the spring **22**, and the other by the use of additional resilient split sleeves which may be telescoped within the inner sleeve **32**, as is obvious from an inspection of Fig. 3. Any required number of additional sleeves for increasing the friction between the sleeve **28** and the inner surface of the followers **17** and **18** may be used, limited, however, by the ability of the spring to restore the parts to normal position after release.

The unit is especially useful in preventing harmonic action of the spring assemblies of railway trucks. By adding or removing friction sleeves the unit can be made adequate for preventing this harmonic action in spring assemblies for cars of either low or high capacities; that is, the capacities of the unit may be varied to meet varying conditions.

It will be noted that the radially outward spring pressure exerted by the sleeves **28**, **32** and **33** against the interior friction walls **23** of the two followers is constant at all degrees of expansion and contraction of the unit, and, moreover, that the areas in frictional contact are constant throughout the range of compression and expansion. It is apparent then that the spring offers substantially constant frictional resistance throughout its entire range of expansion and contraction. Unlike many spring units of this general type, the frictional resistance of the present spring unit does not drop off sharply as the spring unit expands to maximum length.

It is thought from the foregoing, taken in connection with the accompanying drawings, that the construction and operation of my device will be apparent to those skilled in the art, and that changes in size, shape, proportion and detail may be made without departing from the spirit and scope of the appended claims.

I claim as my invention:

1. A bolster spring unit comprising a pair of opposed chambered followers spaced apart, each follower having an outwardly extending flange at its outer end and each having a cylindrical friction surface, a spring between said flanges, and

a plurality of expansible split sleeves extending between and into said followers, each inner sleeve biasing the remaining sleeves radially outwardly, the outer surface of the outer sleeve frictionally engaging the interior walls of said followers.

2. In a device of the class described, a pair of chambered followers spaced apart and facing each other, each follower having a cylindrical friction surface, a split friction sleeve normally of greater diameter than the internal diameter of said chambers extending into said chambers and frictionally engaging said cylindrical surface, and one or more split sleeves of resilient material telescoped within said first-named sleeve and biasing the latter radially outwardly, and resilient means for restoring the parts to normal position after release.

3. A bolster friction spring unit comprising a pair of chambered followers spaced apart each having an interior cylindrical friction surface, a one-piece expansible friction sleeve frictionally engaging both said interior surfaces of said followers, a one-piece expansible sleeve member engaging said friction sleeve for expanding the same radially outwardly, and resilient means surrounding said chambered follower for expanding said unit after compression and release.

4. In a friction spring unit for use on railway equipment, a pair of chambered followers each having a hollow portion having an inner friction surface and a flanged portion, a spring surrounding said hollow portions and abutting against said flanges, the interior of said hollow portions being enlarged in internal diameter at their outer end portions to form shoulders, and an expansible friction one-piece split sleeve frictionally engaging the interior walls of said chambers and having outwardly extending members for engaging said shoulders for limiting the expansion of said unit.

5. In a bolster friction unit, a pair of open-ended followers facing each other and spaced apart, said followers having cylindrical friction faces on their interior, a plurality of resilient telescoped members between said followers and extending therein, the outer of said members frictionally engaging the interior friction surfaces of said followers substantially throughout their entire circumferences, each of said telescoped members having a greater unrestrained diameter than its diameter in the unit and tending to radially expand for frictionally resisting the compression of said unit, and means for restoring the parts to normal position after release.

6. In a friction spring unit for use on railway equipment, a pair of chambered followers each having a hollow portion having an inner friction surface and a flanged portion, a spring surrounding said hollow portions and abutting against said flanges, and friction means including a one-piece split sleeve member biased radially outwardly by its inherent resiliency and engaging the friction surfaces at the inner ends of said followers substantially throughout the entire inner circumference thereof.

7. A bolster friction spring unit comprising a pair of chambered followers spaced apart each having an interior cylindrical friction surface, and friction means comprising a plurality of telescoped split sleeves, each sleeve comprising a single member biased radially outwardly and the outermost one engaging the friction surfaces at the inner ends of said followers substantially throughout the entire inner circumference thereof.

8. In a bolster unit for acting with substantially uniform frictional resistance throughout its range of movement between maximum extension and maximum compression, a pair of chambered followers each having a cylindrical frictional surface of uniform inner diameter, a helical spring acting in compression between said followers to expand the unit, means to limit the expansion of the unit by said helical spring, and a spring in the form of a sleeve with a single split with two adjacent edges, said last named spring being of greater unrestrained diameter than the inner diameter of said frictional surfaces and being confined within the diameter of said surfaces for continuously exerting outward radial pressure against said surfaces, the longitudinal extent of the areas of contact between each of the two followers and the areas of said last named spring on opposite sides of the split therein being substantially equal, thereby avoiding any material tendency for said last named spring to be expanded by unbalanced longitudinal forces.

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