G. H. FORSYTH.

STRAIN RESISTING MECHANISM.

APPLICATION FILED MAR. 6, 1906.

945,226. Patented Jan. 4, 1910.

Fig. 1.

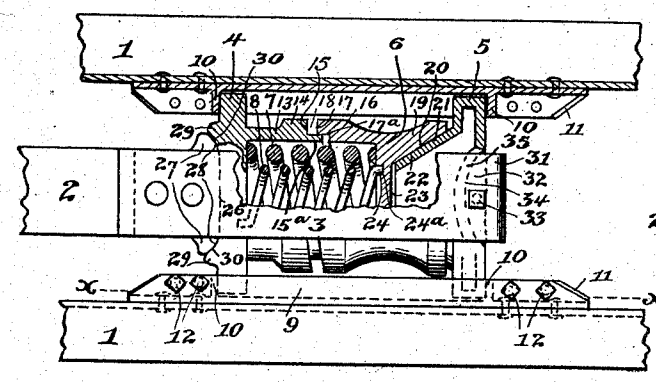


Fig. 5.

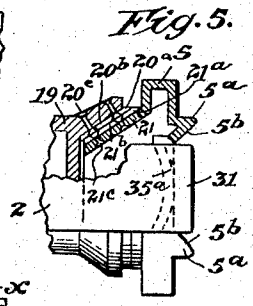


Fig. 2.

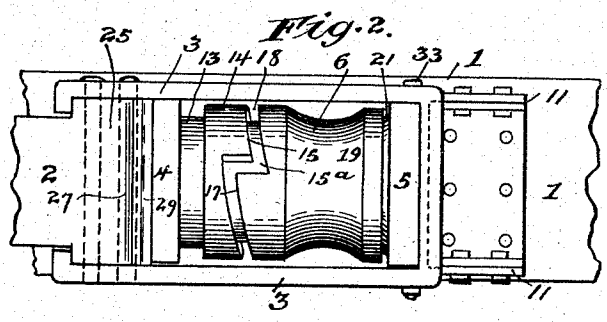


Fig. 3

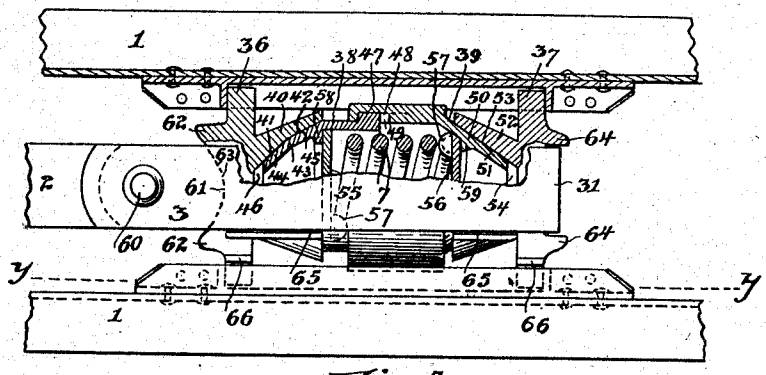
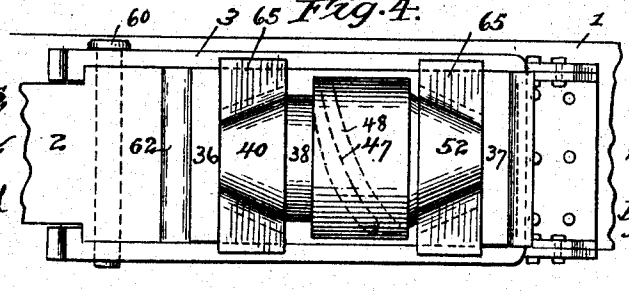


Fig. 4.



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UNITED STATES PATENT OFFICE.

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STRAIN-RESISTING MECHANISM.

945,226. Specification of Letters Patent. Patented Jan. 4, 1910.

Application filed March 6, 1905. Serial No. 248,635.

To all whom it may concern:

Be it known that I, GEORGE H. FORSYTH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Strain-Resisting Mechanism, of which the following is a specification.

This invention has to do with strain resisting mechanism. While I have shown it as applied to the draft rigging of cars, I desire to be understood that I do not limit its use to this particular service; the principle of the invention being applicable to various kinds of resisting mechanism.

More especially I have shown my invention applied to what is commonly known as friction draft rigging for railway cars in which, in addition to an elastic medium, there are commonly employed wedge members adapted to move in vertical or horizontal planes. Among other objections that have been present in this latter type of draft rigging, have been the more or less limited areas of friction surfaces of the cooperating members that are brought into active engagement during the operation of the draft rigging mechanism; and the fact that under sudden and violent applications of buffing or draft stress, there has been a tendency for the friction members to travel by each other a considerable distance before becoming frictionally engaged with each other to any considerable extent. In other words, not only have the friction engaging surfaces been limited in area, but they have a tendency to slip by each other and not to actively engage each other at the time of the initial shock of buffing or draft, particularly when the latter has been of a sudden and violent nature.

In my invention, I employ a member, having preferably a wedge formation, which, during the strains of buffing or draft is adapted to have a rotary movement. I prefer to employ upon or in conjunction with said wedge a friction surface which engages the friction surface of the coöperating member during rotation of the wedge.

Referring to the drawings, Figure 1 is a plan view partly broken away and partly in section embodying one form of my invention; Fig. 2 is a side elevational view of Fig. 1 on the line *x—x;* Fig. 3 is a plan view also partly broken away and partly in section of a modified form of my invention; Fig. 4 is a side elevational view of Fig. 3, along the line *y—y;* and Fig. 5 is a detailed fragmentary view, partly broken away and partly in section of a modified form of an end portion of Fig. 1.

Referring to the drawings, 1 designates the ordinary center or draft sills of a car, which may be of steel or wood construction.

2 is the draw bar, to whose inner end is attached the yoke 3.

In Figs. 1 and 2, 4 designates the front follower, 5 the rear follower, and 6 a rotatable member.

7 represents an ordinary coil spring within which is located a second and lighter coil spring 8.

9 is a draft casting riveted to the sills 1 and having transverse walls 10, against which abut the ends of the followers 4 and 5. Supporting the latter are bars 11 fastened to the under side of the castings 9 by the bolts 12.

The rear face of the follower 4 is provided with a shell 13 whose outer marginal edge is thickened as shown at 14, the rear end surface of which at 15 is formed on a spiral adapted to engage a corresponding spiral 17 also formed on the thickened portion 16 of the rotatable member 6. Between the engaging surfaces 15 and 17, I allow a space 18 through which the follower 4 and the rotatable member 6 may travel before the said spiral surfaces become actively engaged. In order to insure accurate registration and engagement of the spiral surfaces 15 and 17, the latter is preferably undercut, as shown at 17^a, such undercut portion being engaged by an annular flange 15^a projecting rearwardly of the surface 15. In this construction the minor blows of buffing or draft are resisted or absorbed by the early or supplemental compression of the springs 7 and 8. The rotatable member 6 is provided with the reëntrant shell 19 having a friction surface 20 adapted to engage a correspondingly inclined friction surface 22 of the conical shell 21 formed on the inner face of the follower 5. The followers 4 and 5 are non-rotatable, owing to engagement with the back wall of the draft castings 9 or the inner face of the yoke 3.

The operation of the mechanism is as follows: The minor strains of buffing or draft are absorbed by the supplemental compression of the springs 7 and 8 until the spirally inclined surfaces 15 and 17 actively engage

each other, after which there is imparted to the rotatable member 6 a rotary movement relatively to the follower 5, thereby causing friction to be produced between the engaging inclined surfaces 20 and 22. I provide a space 23 between the bottom of the shell 19 of the rotatable member 6 and the inner edge of the shell 21 of the follower 5, thereby allowing for wear between the surfaces 20 and 22. The lighter coil spring 8 has its ends offset at 24, the same being seated in the pockets 24^a of the follower 4 and the rotatable member 6. It must, therefore, be evident that during the compression of the draft rigging mechanism under the strains of buffing or draft, there is imparted, under relative rotative movement between the follower 4 and the rotatable member 6 a torsion or twist to the coil spring 8. When the draft rigging mechanism is, therefore, fully compressed and the strains of buffing or draft withdrawn, the said spring 8 tends to rotate the rotatable member 6 in a reverse direction and to return it to its normal position with respect to the follower 4.

In Figs. 1 and 2, the yoke 3 is riveted to the end 25 of the draw bar 2 as shown. The inner end of the draw bar is flattened as indicated at 26 and is provided laterally with the ears 27 having inclined or curved surfaces 28 to engage the correspondingly inclined or curved surfaces 30 of the projections 29 formed on the front face of the follower 4. Located adjacent to the upright 31 of the yoke 3 is the block 32 secured in position by the bolt 33. This block is provided with a convex face 34 adapted to engage a concave surface 35 formed centrally on the outer face of the follower 5. It must be evident that the inclines 28 and 30, 34 and 35 coöperate during the outward thrust of the springs 7 and 8 to return the yoke and the draw bar, when drawn to one side, to a central position.

In Figs. 3 and 4 I show a modified form of my invention, in which I provide followers 36 and 37, intermediate of which are located the rotatable members 38 and 39. In this construction I have shown a single spring 7, although it is evident that an inner spring could be employed if desired. The follower 36 is provided on its inner face with a reëntrant shell 40, having inclined surfaces 41 and 42 which engage correspondingly inclined surfaces 44 and 45; the latter being formed on the conical extension of the rotatable member 38. I allow a space 46 between the bottom of the reëntrant shell 40 and the edge of the conical member 43 to allow for a wedging action and wear between the friction surfaces 41, 42, 44 and 45. The rotatable member 38 is provided on its inner margin with a spiral thread 47 which is adapted to engage a spiral groove 48 of the rotatable member 39. The width of the spiral thread 47 is less than that of the spiral groove 48, leaving a space 49 permitting a relative telescoping movement between the rotatable members 38 and 39 before relative rotary movement is set up between the said members.

The rotatable member 39 is provided with a conical extension 50 having the friction surface 51 which is adapted to engage a friction surface 53 provided on the inside of a reëntrant shell 52 formed on the inner face of the follower 37 a space 54 being provided beyond the cone 50 to allow for a wedging action and wear. The spring 7 abuts against the washers 55 and 56, which in turn respectively abut against the off-set portions 58 and 59 of the rotatable members 38 and 39. In order to prevent wear between the ends of the spring 7 and the washers 55 and 56, I provide the latter with abutment stops or seats 57, against which the ends of the bar from which the spring 7 is made abut. By this arrangement the rotative movement occurs between the washers 55 and 56 and the abutment shoulders 58 and 59 instead of between the washers respectively and the ends of the spring. The followers 36 and 37 do not rotate during the action of the draft rigging, owing either to their ends or the ears 66 engaging the draft castings 9 or because of the elevations 65 bearing against the edges of the yoke 3, or because of the top and bottom of said followers bearing against the inner walls of the yoke 3.

The operation of the mechanism is as follows: During the minor strains of buffing or draft, the rotatable members 38 and 39 have telescoping movement relative to each other through the space 49. During this time the strains are resisted or absorbed by the spring 7. After this point has been passed, however, the spiral thread 47 engages the groove 48, producing relative rotary movement between the rotatable members 38 and 39. During the latter movement friction is produced between the engaging surfaces 41, 44, 42 and 45 or between the friction surfaces 51 and 53 or between all of said surfaces.

In the construction shown in Figs. 3 and 4, upon the withdrawal of the strains of buffing or draft, the action of the spiral thread 47 operating in the groove 48 under the outward thrust of the spring 7 is to rotate the members 38 and 39 in a reverse direction, returning them to their normal positions.

In the constructions shown in Figs. 3 and 4, the yoke 3 is fastened to the draw bar 2 by means of the bolt 60 instead of the yoke being riveted to the draw bar, as shown in Figs. 1 and 2. The end of the draw bar shown in Fig. 3 is curved or inclined at 61, thereby engaging a coöperating curve or incline 63 provided on the front face of the follower 36 and laterally projecting portions 62 of the latter. It must be evident

that the inclines 61 and 63 tend, under the outward thrust of the spring 7, to return the draw bar, when drawn to one side, to a central position. The rear end of the yoke is maintained centrally of the car by means of the projections 64 formed on the rear face of the follower 37 between which lies the upright 31 of the yoke 3.

In Fig. 5 I have shown a modification of the construction shown in Fig. 1. Herein I provide wearing plates 20^a and 21^a which are respectively fastened to the rotatable member 6 and the follower 5 by means of the rivets 20^c and 21^c affording friction surfaces 20^b, 21^b. In this construction, I also omit the block 32, shown in Fig. 1, allowing the upright 31 of the yoke 3 to engage a convex surface 35^a formed centrally of the outer face of the follower 5. The latter permits ready rocking movement between the upright 31 of the yoke 3 and the follower 5 at this point. I also provide the rear face of the follower 5 with projections 5^a having inclined surfaces 5^b tending to return the draw bar, when drawn to one side, to a central position. It must be evident, therefore, that the conical or cylindrical friction surfaces in my construction engage each other throughout a greater area for the same axial length than those wedge members do which, as in the case of the ordinary friction rigging, contact each other simply in a vertical or horizontal plane. It must also be evident that where the wedge members travel in the direction of the buffing or draft strains applied thereto, there is present a greater tendency for slippage between the friction surfaces of said members and those of the coöperating members of the draft rigging mechanism than is present in my construction wherein the friction surfaces are not only under wedge tension with each other but have a relatively rotatable movement. By altering the inclines of the rotatable wedges in my invention, I can readily augment or decrease the frictional resistance capacity of the resistance mechanism without changing the strength of the elastic medium thereof.

By the term "wedge-member" as used herein I wish to be understood as meaning, not a member which by virtue of one or more inclined or cam surfaces engaging with a similar surface or surfaces on a cooperating member tends to set up relative rotation or angular displacement, but a true wedge which under strains and during the action of the parts effects, by virtue of its wedge formation, an increasingly intimate contact and frictional engagement with the member which it engages. I am aware that wedge-members such as above defined have been employed in strain-resisting mechanisms wherein the movement brought about is purely a relative straight sliding movement in one direction; but the novel peculiarity of my invention, as it relates to the wedge-member, lies in the fact that the relative movement between said wedge-member and its coöperating member is a rotatable one.

I claim:

1. In a strain-resisting mechanism, the combination with a resistance spring, of a pair of coöperating members having their adjacent ends of spiral formation whereby relative rotation of said members is set up when the same are forced together, and a supplemental spring acting to turn said members back to normal position, substantially as described.

2. In a draft-rigging mechanism, the combination with a resistance medium and a follower having inclined surfaces on its face exterior to the sides of the draw-bar, of a draw-bar having inclined surfaces adapted to operatively engage said inclined surfaces of the follower when drawn to one side, substantially as described.

3. In a draft-rigging mechanism, the combination with a resistance medium and a follower having inclined surfaces on its face to either side of the draw-bar, of a draw-bar having a substantially flat contact with the face of the follower between said inclined surfaces, substantially as described.

4. In a draft-rigging mechanism, the combination with a resistance medium and a follower having inclined surfaces on its face to either side of the draw-bar, of a draw-bar having lateral ears engaging said inclined surfaces on the follower, substantially as described.

5. In a draft-rigging mechanism, the combination with a resistance medium and a follower having inclined surfaces on its face to either side of the draw-bar, of a draw-bar having a substantially flat contact with the face of the follower and also having lateral ears engaging said inclined surfaces on the follower, substantially as described.

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