This invention relates to stabilized car trucks of the type in which wedge-shaped friction blocks or shoes are arranged in such operative relationship to the car bolster that when the bolster moves downwardly under the influence of a load against the action of the load supporting springs the shoes are pressed into tightened frictional engagement with suitable surfaces on the truck frame so as to dampen the succeeding upward surge of the bolster.

Devices of this type have been provided heretofore in which springs have been employed for pressing wedge-shaped shoes into frictional engaging position; in some cases such springs and their cooperating parts being arranged so as to exert substantially constant pressure on the shoes for urging them into operative wedgeing position as the bolster moves downwardly, and in other cases the springs being mounted and arranged so as to exert progressively increasing pressure on the shoes as the bolster moves downwardly.

While the above principles have been separately embodied in railway car trucks, they have not been heretofore combined satisfactorily in a single structure. It has been regarded as impractical, to combine the function of such springs in a single structure, because of the different lengths of the springs ordinarily required to exert the constant and the progressively increasing pressures and also because there is but limited space available in truck structures for mounting the separate springs. However, the present invention overcomes the above difficulties by the provision of improved constructions and arrangements, whereby separate springs may be disposed in a compact arrangement so as to permit the use of springs of appropriate lengths and, at the same time, simplify the dismantling and re-assembling operations in connection with the repair and replacement of springs, friction shoes or other parts of the truck.

A further and more specific object of the invention includes an arrangement whereby the stabilizing spring for exerting progressively increasing pressure on the friction shoe, of the stabilizing structure, extends through a constant pressure spring and bears directly against the shoe, the constant pressure spring being supported on a plate arranged beneath, but moving with the bolster.

Another object is to provide a unitary spring structure, for use in stabilized car trucks, which springs will exert constant pressure against friction elements associated therewith during all vertical movements of a truck bolster and will also exert progressively increasing pressure on said friction elements during vertical movements of the bolster in one direction.

The preferred means by which the several objects of the invention are accomplished are illustrated in the accompanying drawing, wherein:

Fig. 1 is a side view of a portion of a car truck embodying the improvements of the present invention;

Fig. 2 is a vertical sectional view taken substantially at the line 2—2 of Fig. 1;

Fig. 3 is a horizontal sectional view taken substantially at the line 3—3 of Fig. 1.

Fig. 4 is a view similar to Fig. 1, but showing stabilized springs of unitary form for exerting both a uniform pressure and a progressively increasing pressure against the friction shoe elements of the truck when the bolster moves downwardly;

Fig. 5 corresponds to Fig. 2, but shows the modified stabilizing spring, and

Fig. 6 corresponds to Fig. 3, but shows said modified spring units.

Referring now to the several figures of the drawing: 10 indicates the side frame of a railway car truck having a bolster window 11 therein for one end portion of a bolster 12. The bolster 12 is yieldingly supported by four heavy coiled springs 13 which seat at their lower ends on a horizontally-positioned plate 14 supported on the side frame. The plate 14 is provided with upwardly extending flanges 15 for controlling the position of the springs 13. The side frame 10 is provided at its end portions with the usual supporting wheels 16 which cooperate with a similar arrangement of wheels and associated parts at the opposite side of the car truck for supporting the truck from the usual track rails 17.

The bolster 12 of the present improved arrangement is provided at opposite side faces with pockets 18, as shown best in Figs. 1 and 3. A surface of each of said pockets is inclined relative to the planes of the side faces of the bolster.

The inclined portions are, preferably, the inner walls 18a of the pockets and they slant downwardly and inwardly with respect to said side faces of the bolster. In the pockets 18 are mounted friction blocks or shoes 19 which are provided with inclined surfaces 19a corresponding substantially to the inclined portions 18a of the pockets. The outer faces of the shoes include friction plates 20 which have frictional engagement with vertically disposed face plates 21 secured to the vertical columns at opposite sides of the bolster opening 11. The arrangement is such
that when the shoes 18-19 at opposite sides of the bolster are moved upwardly with respect to the bolster, they are at the same time caused to move horizontally into effective pressure relationship to the vertically disposed face plate portions as to resist vertical movement of the bolster in the side frame.

Resilient elements apply pressure to the shoes 18-19 in a direction to move them upwardly relative to the bolster. In one embodiment of the invention (Figs. 1, 2 and 3) the resilient elements comprise two coil springs, one of which exerts constant uniform pressure against its associated shoe element 19 and the other spring exerts a progressively increasing pressure against the shoe element when the bolster 12 moves downwardly. In another embodiment the resilient elements are in the form of unitary structures in which one portion of a unit element said to act as a controllable pressure element in the side frame. This improved means shown in Figs. 1, 2 and 3 for supporting the shoes 18-19 comprises a horizontally disposed metal plate 22 interposed between the lower face of the bolster and the upper ends of the springs 13. The said plate moves with the bolster and is preferably, though not necessarily, provided with upwardly open sockets 23-23 in which there are mounted coiled springs 24. These springs bear at their upper ends against the bottom faces of the shoes 19-18. The downwardly extending pockets are positioned between adjacent load springs 13 and consequently permit the use of springs 24 of suitable length when the dimensions of the bolster might otherwise limit the length of these springs. Other coiled springs 25 of smaller diameter than the springs 24 are mounted inside of the springs 24, bearing at their lower ends against the shoes 18 and mounted at their upper ends on a wear plate 26 supported evenly by a portion of the side frame 10. The said springs 25 preferably bear in each case against a depending stud portion 31 formed on the bottom of the shoes 19. These extension studs may be of any desired length so that the length of the springs 25 may be correspondingly reduced.

In operation, the bolster 12 is adapted to move downwardly under the influence of the load thereon, causing the load supported springs 13 to be compressed. When this takes place, the plate 22 and the springs 24 move downwardly with the bolster, so that the springs 24 exert a constant pressure at all times on the shoes 18-19 for pressing them upwardly. The springs 25; however, which are mounted on wear plate 26, support the side frame 16, exert progressively increasing pressure on the shoes for forcing them upwardly with respect to the bolster as the bolster moves downwardly. By the use of this arrangement, the constant pressure by the springs 24 function to stabilize the movements of the bolster when the car is empty or when only a light load is imposed on the load springs. These springs are particularly effective to dampen any upward movement of the bolster above its normal range of movements. The pressure exerted by the constant pressure springs 24 is immediately reinforced by the progressively increasing pressure exerted by the springs 25 as the bolster is moved farther and farther downwardly. As this upward pressure on the shoes increases during the downward movement of the bolster, the shoes are forced into progressively increasing frictional engagement with the vertical plate portion 21 of the side frame. By the time the bolster reaches its lowestmost position, the shoes 19 are tightened firmly between the bolster and the face plate portions of the side frame and are thus in highly effective position for frictionally opposing the initial upward movement of the bolster on the return oscillation of the parts. This strong opposition to the upward movement at the start of the upward movement effectively breaks the rhythm of the oscillation. As the bolster moves upwardly, the pressure exerted by springs 25 decrease, but the constant pressure spring 24 exert their full pressure. This arrangement has been found very effective for preventing the progressive building up of heavy oscillations and causing the car to comfort the passengers.

The improved arrangement and construction herein shown serve to simplify the initial assembling operations in that it is unnecessary to move the friction shoes into retracted positions against the compression of the springs 24 and 25, preliminary to the insertion of the bolster in the window 11. When the bolster is being assembled in the side frame or when it is being disconnected therefrom, it is merely supported in an elevated position so as to remove its weight from the springs 13. The load supporting springs 13 and likewise the stabilizing springs 24 and 25 may be readily removed. The bolster can then be moved downwardly into position, whereby the outer end of the bolster, including the side lugs 28 thereon, may be withdrawn through the widened portion of window 11. Meanwhile, the shoes 19 in raised position during such adjustments, pins 29 are inserted through openings in vertically positioned cross-plate portions 30 at opposite sides of the pockets 18 and through large openings 31 formed in the shoes, as shown in Fig. 1.

Referring now to the modifications shown in Figs. 4, 5 and 6. The side frame, bolster and load supporting springs of the embodiment shown in Figs. 4, 5 and 6 may be, and preferably are, identical to the corresponding elements shown in Figs. 1, 2 and 3 and, therefore, are identified by the same reference characters. The modifications reside principally in the provision of unitary spring elements designated generally by the reference characters 38-38 which are arranged in the same position as springs 25 of the previous embodiment to bear against the bottom surfaces of wedge-like shoe elements 39-39 arranged in the pockets 18-18 at opposite sides of the bolster 12. Each unitary spring element 38 comprises a long portion 38a which seats at its lower end on the plate 26 and bears at its upper end against the bottom of the friction shoe 39. The said spring unit includes also an outer spring 38b, the uppermost convolution of which connects with the upper convolution of the long spring 38a. The upper end of the spring portion 38b, therefore, bears against the bottom surface of the friction shoe 39. The lower end of the spring 38b is operated on a plate 22 in the same manner as indicated in Fig. 1.

When assembling the modified truck structure the unitary springs 38-38 are first positioned in the openings of the supporting plate 22 and the plate is inserted within the window openings of the truck side frame while the bolster is supported in an elevated position. The load springs 13 are then positioned beneath the bolster so as...
to bear against the plate 22 and the bolster is then lowered to its operative position. While the form and arrangement of parts as shown in the drawings and as above described are preferred, the invention is not to be limited thereto, except so far as such form and arrangement are specifically claimed, it being understood that changes may be made in the arrangement without departing from the spirit of the invention.

I claim:

1. A stabilized car truck comprising in combination a side frame having vertical columns defining opposite sides of a bolster window, a bolster having an end portion extending through said window, resilient means for supporting the bolster with capacity for vertical movements, and means for stabilizing the movements of the bolster comprising a friction shoe supported for movement with the bolster and adapted to bear against one of said vertical columns, an inclined surface on the shoe, an inclined surface movable with the bolster and engaging said inclined surface of the shoe for displacing it horizontally toward said column, resilient means for exerting pressure against said shoe to effect said horizontal displacement thereof comprising a constant pressure shoe actuating spring movable with the bolster, means extending vertically from said bolster and providing a seat for said constant pressure spring, a second spring for actuating said shoe which spring engages the shoe and exerts force thereon in the same direction as the said constant pressure spring, and means for supporting the lower end of the second spring in fixed relation to said side frame of the truck, whereby the force exerted by the second spring progressively increases during downward movement of the bolster.

2. A stabilized car truck comprising in combination a side frame having vertical columns defining opposite sides of a bolster window, a bolster having an end portion extending through said window, resilient means for supporting the bolster with capacity for vertical movements in said window, an inclined surface on the shoe, an inclined surface movable with the bolster and engaging said inclined surface of the shoe for displacing it horizontally toward said column, resilient means for exerting pressure against said shoe to effect said horizontal displacement thereof comprising a shoe actuating helical spring movable with the bolster, means extending vertically from said bolster providing a seat for said spring, a second helical spring for actuating said shoe, the second spring being arranged with one end thereof extending through a portion of the first mentioned shoe actuating spring into engagement with the shoe, and means for supporting the other end of the second spring in fixed relation to said side frame of the truck, whereby the force exerted by the second spring progressively increases during vertical movement of the bolster in one direction.

3. A stabilized car truck comprising in combination a side frame having vertical columns defining opposite sides of a bolster window, a bolster having an end portion extending through said window, resilient means including a group of heavy springs arranged in said window for supporting the bolster with capacity for vertical movements, and means for stabilizing the movements of the bolster comprising a friction shoe supported for movement with the bolster and adapted to bear against one of said vertical columns, an inclined surface on the shoe, an inclined surface on the bolster and engaging said inclined surface of the shoe for displacing it horizontally toward said column, resilient means for exerting pressure against said shoe to effect said horizontal displacement thereof comprising a shoe actuating spring interposed between said bolster and said heavy springs on which the bolster is supported, a second helical spring for actuating said shoe, which second spring is arranged with one end portion extending through said supporting plate and a portion of the first mentioned shoe actuating spring into engagement with the shoe, and means for supporting the other end of the second spring in fixed relation to said side frame, whereby the second mentioned shoe actuating spring exerts progressively increased pressure against the shoe as the bolster moves in one direction.

4. A stabilized car truck comprising in combination a side frame having vertical columns defining opposite sides of a bolster window, a bolster having an end portion extending through said window, resilient means including a group of heavy springs arranged in said window for supporting the bolster with capacity for vertical movements in said window, an inclined surface on the shoe, an inclined surface on the bolster and engaging said inclined surface of the shoe for displacing it horizontally toward said column, resilient means for exerting pressure against said shoe to effect said horizontal displacement thereof comprising a shoe actuating spring interposed between said bolster and said heavy springs on which the bolster is supported, the plate being provided with an upwardly opening cup for receiving said shoe actuating spring, and a second helical spring for actuating said shoe, which second spring is arranged with one of its ends extending through said supporting plate and a portion of the first mentioned shoe actuating spring into engagement with the shoe, and means for supporting the other end of the second spring in fixed relation to said side frame, whereby the second mentioned shoe actuating spring exerts progressively increased pressure against the shoe as the bolster moves in one direction.

5. A stabilized car truck, comprising in combination, a side frame, a transversely-positioned bolster having its end portion extending through a window opening in the side frame so as to permit free vertical movement of the bolster with respect to the side frame, load supporting springs seated on a portion of the frame in position to engage the end of the bolster, a shoe movable vertically with the bolster with respect to the side frame and provided with a vertically extending inclined face and a vertical friction face movable vertically relative to the bolster, means defining a vertically inclined face on the bolster for engaging the inclined face of said shoe for dis-
placing said shoe horizontally to press said friction face thereof against the frame when the shoe is moved vertically of the bolster, resilient means positioned to exert vertical pressure on the shoe cooperating with said vertically inclined face of the bolster and said shoe to effect said horizontal displacement comprising a first portion movable with the bolster for exerting constant pressure on the shoe and a second portion for exerting progressively increasing pressure on said shoe means thereby progressively increasing the pressure of the shoe against said frame, means movable with the bolster for holding the first portion of said resilient means under compression, and means carried on the side frame for supporting the second portion of said resilient means under compression.

6. A stabilized car truck, comprising in combination, a side frame member, a transversely-positioned bolster having its end portion positioned in a window opening in the side frame so as to permit free vertical movement of the bolster with respect to the side frame, load supporting springs seated on a portion of the frame in position to engage and support the end of the bolster, a shoe formed with a vertically extending inclined face and movable with the bolster vertically with respect to the side frame and movable vertically of the bolster mean defining a vertically extending inclined face movable with said bolster and cooperating with said inclined face on the shoe for displacing said shoe horizontally into frictional engagement with the frame when the shoe is moved vertically of the bolster in one direction vertically disposed spring means having a portion supported for movement with said bolster and a second portion supported at one end with fixed relation to the side frame and cooperating with the first portion for affecting said vertical movement of the shoe relative to the bolster, a plate movable with the bolster for holding the first mentioned portion of the spring means under compression, and means bearing on the side frame for supporting the second portion of said spring means compressed against said shoe.

7. A stabilized car truck, comprising in combination a side frame member, a transversely-positioned bolster having its end portion positioned in a window opening in the side frame so as to permit free vertical movement of the bolster with respect to the side frame, heavy springs seated on a portion of the side frame in position to engage and support the end of the bolster, an upwardly-tapered shoe positioned between and engaging cooperating surfaces on the bolster and the side frame, shoe means movable vertically with respect to the said bolster and the side frame to exert wedging pressure against the bolster and the side frame, means for causing the wedging pressure of said shoe against the bolster and the frame, comprising a coiled stabilizing spring having one end engaged to support the other end of the spring in fixed relation to the side frame, a plate carried by the bolster and extending horizontally adjacent to said stabilizing spring but out of engagement therewith, and a second coiled stabilizing spring surrounding an end portion said first named stabilizing spring and supported by said plate in position to press against said shoe.

8. A stabilized car truck comprising in combination a side frame having vertical columns defining opposite sides of a bolster window, a bolster having an end portion extending through said window, load supporting springs mounted with respect to the bolster, a plate member intersected between the bolster and said load supporting springs and means for stabilizing the movements of the bolster comprising friction shoes supported at opposite sides of the bolster for movement with the bolster and adapted to bear against said vertical columns, an inclined surface on each shoe, inclined surfaces movable with the bolster and engaging said inclined surfaces of the shoes for displacing them horizontally toward said columns, resilient means for exerting pressure against said shoes to effect said horizontal displacement thereof comprising in each case a unitary resilient element including a constant pressure exerting portion engaging a friction shoe and seating on said plate so as to move bodily with the bolster and a second portion having one end engaging the shoe and means for supporting the other end of said second portion in fixed position relative to a portion of the frame beneath said shoe and in longitudinal alignment with said constant pressure portion of the spring, whereby the combined force exerted by both portions of the spring is increased in relation to the extent of downward movement of the bolster.

10. A stabilized car truck comprising in combination a side frame having vertical columns defining opposite sides of a bolster window, a bolster having an end portion extending through said window, load supporting springs on which the bolster is supported, a plate member intersected between the bolster and said load supporting springs and means for stabilizing the movements of the bolster comprising friction shoes supported at opposite sides of the bolster for movement with the bolster and adapted to bear against said vertical columns, an inclined surface on each shoe, inclined surfaces movable with the bolster and engaging said inclined surfaces of the shoes for displacing them horizontally toward said columns, resilient means for exerting pressure against said shoes to effect said horizontal displacement thereof comprising in each case a resilient element including a portion engaging a friction shoe and seating on said plate so as to move bodily with the bolster and a variable pressure exerting portion which engages the shoe, and means for supporting the other end of the variable pressure por-
tion of the spring in fixed relation to a lower portion of the side frame, whereby the pressure exerted by the variable pressure portion against said shoe is increased during downward movement of the bolster.

11. In a car truck, a side frame, a bolster resiliently supported on said side frame, a shoe carried in the bolster and frictionally engaging a surface of the side frame, spring means urging said friction shoe against said surface comprising a unitary spring having a portion maintaining a constant force on the friction shoe regardless of the weight on the bolster and a second portion maintaining a variable force on the friction shoe and increasing directly with the load on the bolster, the total force between the friction shoe and said surface of the side frame being at all times the sum of the independent forces exerted separately by the constant force portion of the spring and the variable force portion of the spring.

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