Oct. 4, 1955 C. D. BARRETT ET AL 2,719,490

CAR TRUCKS

Filed Aug. 8, 1946

FIG. 1.

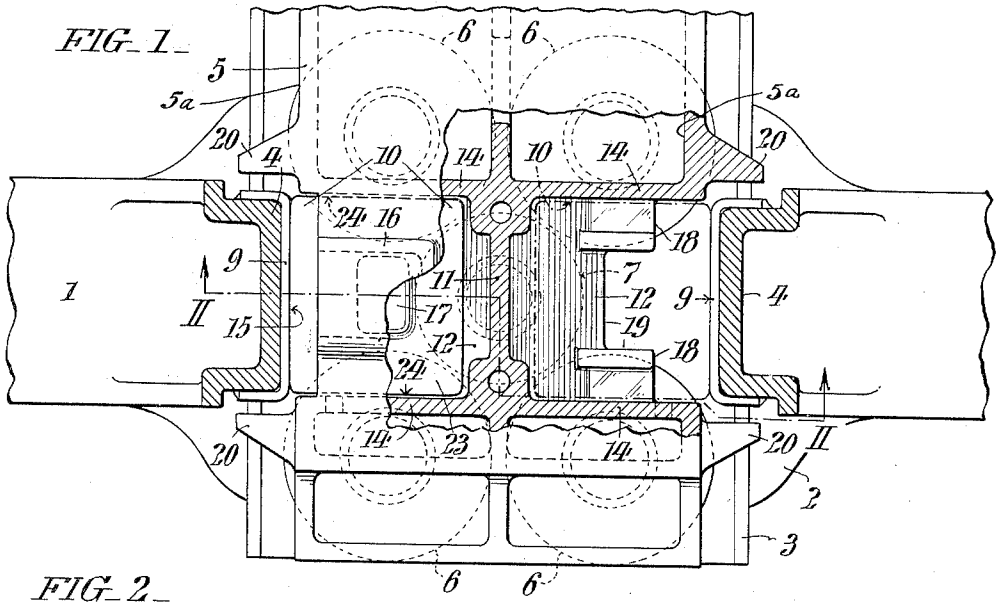
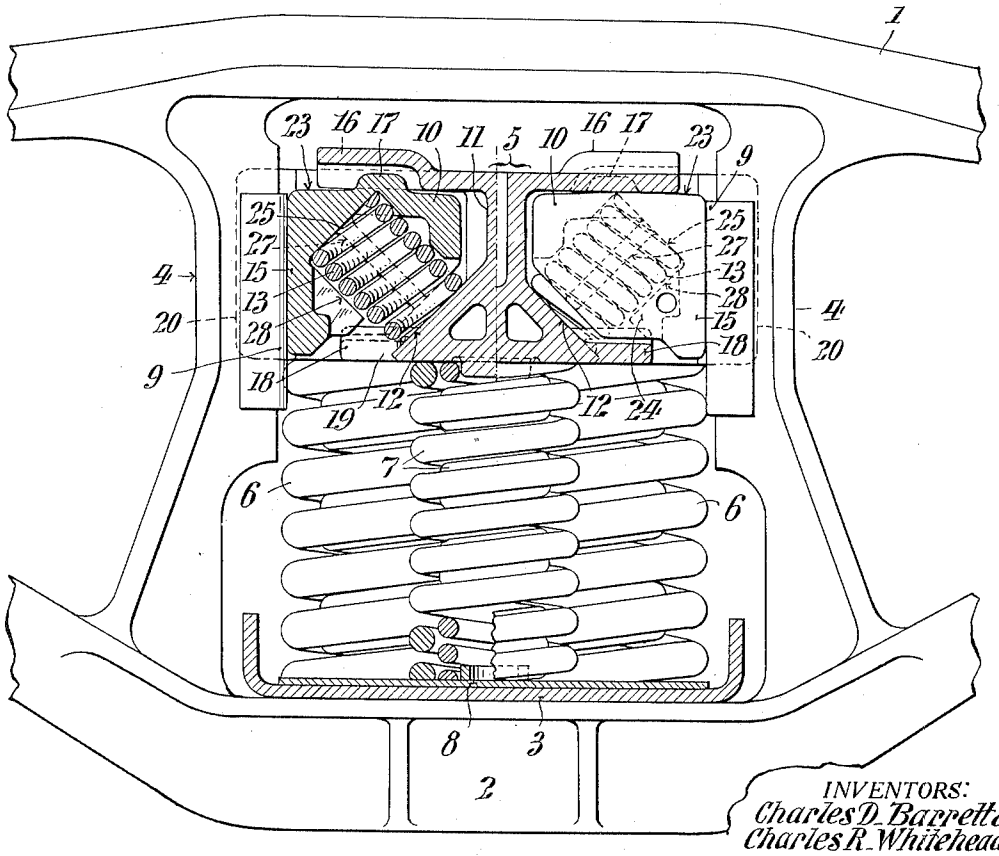


FIG. 2.



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This invention relates to a car truck, and more particularly to a high speed railway car truck involving friction means used in association with springs for controlling the relative movement between the ends of the bolster and the side frames.

Heretofore it has been proposed to employ wedge elements in combination with springs to provide friction between the ends of the bolster and the columns of the side frame between which the bolster is guided in its vertical movement. The wedge element is forced by the spring into firm contact with the friction face of the side frame and also into firm contact with an inclined surface of the bolster so that the vertical movement of the bolster is transmitted to the wedge element and the bolster cannot move vertically relative to the side frame without producing a vertical friction force between the side frame and wedge element. This force is transmitted directly to the bolster and serves to dampen the action of the spring supporting the bolster.

Such car trucks in some instances have involved radical departures from the conventional form of side frame in order to gain the necessary space for accommodating the additional springs and wedge elements for producing the desired dampening effect upon the bolster to reduce vibration and to cushion the rebound of the bolster. In other instances the special springs associated with the friction devices are confined to small spaces and therefore have insufficient capacity to perform their intended functions.

The object of the present invention is to provide a car truck of the character indicated in which the elements are so designed that no changes need be made in the conventional form of the side frames, and in which the spaces within the side frame windows and in the interior of the bolster are used to the fullest advantage to give the necessary spring capacity for effectively controlling the harmonic motion of the bolster.

A further object of the invention is to provide a compartmentation of the ends of the bolster within which such friction devices are housed of such design that the bolster is not structurally weakened as a load-supporting member, but the compartments formed therein nevertheless have ample space for receiving the friction devices including such special springs of the necessary capacity.

Our Patent No. 2,446,506 discloses and claims a similar arrangement in which the wedge elements are urged against the friction faces of the side frame columns by springs under substantially constant pressure and by other springs under pressure substantially proportional to the load of the bolster.

Other objects and advantages characterizing our present invention, including those derived from simplicity and economy of manufacture, will become more apparent from the detailed description of a practical embodiment of the invention which follows hereinafter having reference to the accompanying drawings, whereof:

Fig. 1 represents a top plan view of one end of a bolster and associated parts of a side frame of a railway car truck embodying the present invention with a portion of the bolster cut away to reveal the interior thereof and with one of the friction shoes and its spring (specifically the shoe which occupies the right hand compartment of the bolster) removed to illustrate details of the bolster.

Fig. 2 represents a vertical cross section of the same taken as indicated by the arrows II—II of Fig. 1, but showing both of the friction shoes and their springs in position within the bolster.

With reference to the drawings one form of the invention as illustrated in which the side frame 1 is of a customary construction and includes a tension member 2 upon which a spring plank or spring support 3 is seated, and vertical columns 4 forming therewith a window within which an end of a bolster 5 is resiliently supported. The main springs in the illustrated example comprise four rectangularly disposed double springs 6 and an additional double spring 7 located in the center of the nest. All of the springs 6, 7 are of helical formation and have their lower ends seated on a spring retainer 8, and their upper ends engaged by the bottom of the bolster 5. The columns 4 of the side frame 1 are provided with friction faces 9 each engaged by a friction shoe 10 carried in the end of the hollow bolster. It will be observed that all parts of the side frame follow a conventional design and hence only relatively simple and inexpensive changes are required to apply the invention to existing trucks and existing truck designs.

The end portion of the bolster 5 comprises side walls 5a and is longitudinally divided by a center wall or rib 11 of inverted Y-shaped section upon which the inner ends of the coil springs 13 are seated. In the interior compartments at opposite sides of the dividing wall 11 the friction shoes 10 are housed, each such shoe having an end wall 15 in sliding frictional engagement with the friction faces 9 of the side frame columns 4. The top of the bolster 5 is formed with raised offsets 16 extending transversely of the bolster and having a shape to accommodate with vertical clearance raised bosses 17 on the friction shoes 10. The friction shoes 10 are guided and confined to a lateral movement within the interior compartments of the bolster having sliding engagement with the vertical side walls 14 of each compartment and with horizontal surfaces adjacent to the offsets 16 at the under side of the top wall of each compartment. That portion of the bolster 5 which is located within the side frame 1 has at the bottom thereof horizontal ledges 18 with an opening 19 between the two ledges which are formed in each compartment. The openings 19 constitute indentations in the lower wall of the bolster which increase the effective length of the inclined surfaces 12 upon which the springs 13 are seated and make it easier to introduce the friction shoes 10 and coil springs 13 within the compartments of the bolster. Flanges 20 are formed on the side of the bolster adjacent to the side frame columns 4 as shown in Fig. 1.

Each friction shoe 10 is in the form of a block having a top wall 23 with a cambered surface in engagement with the top wall of the bolster 5 and having side walls 24 confined by vertical transverse walls 14 of the bolster. Each friction shoe has a diagonal wall 25 paralleling the inclined surfaces 12 formed at the base of the dividing wall 11 or center rib of the bolster 5, the portion of said rib above the surfaces 12 being in the form of a flat segment coplanar with the longitudinal vertical center plane of the bolster, and as best seen in Figure 1, the planes of the side walls 5a are substantially parallel thereto. The inclined surface 12 and 25 of the bolster and friction shoe serve as seats against which the inner and outer ends of the springs 13 bear. Each spring 13 is disposed at a

relatively sharp angle to the direction of the movement of the bolster so that it forces the shoe **10** not only against the friction faces **9** of the side frame but also against the top wall of the bolster. By holding the friction shoes **10** against the top wall of the bolster, even though the coefficient of friction between the friction shoes and side frame is very much higher than normal the shoes move up and down with the top wall of the bolster and are at all times urged upwardly and outwardly producing friction between each shoe and the friction face **9** of the side frame. The springs **13** are each confined to axial movement within a definite space by ribs **27, 28** projecting internally of the friction shoe **10**, and it may be noted that each spring **28** is housed for the major portion of its length within the related shoe **10**, thereby affording a compact arrangement in which the spring **28** may be of maximum length within the available bolster space to accommodate expansion of the spring as wear takes place between the shoe **10** and its engaged friction face **9**.

In the illustrated example of the invention the springs **13** exert a constant pressure upon the friction shoes **10** independent of the action of the main springs **6, 7** which resiliently support the bolster. It will be noted that the design of the end portion of the bolster is such that the dividing wall **11** supports the load directly over the central springs **7** of the nest of springs within the window of the side frame while distributing the weight of the vehicle through the inclined walls **12** to the outer rectangularly disposed springs **6**. The structural strength of the bolster **5** is thus maintained while providing adequate space for accommodating the friction shoes **10** and their springs **13** as well as providing a form of comparmentation of the bolster which permits these elements to be readily installed when assembling the car truck.

It will also be apparent that placing the springs **13** at a relatively sharp angle with respect to the direction of movement of the bolster effectively holds the shoes **10** in their proper positions while permitting the use of relatively large springs. The inclined position of the springs **13** insures that any movement of the bolster **5** in a vertical direction will be accompanied by a corresponding movement of the friction shoes **10** with resulting frictional resistance at the columns **4** of the side frame **1**. Moreover the construction of the friction shoes **10** and the manner in which they are held within the bolster while subject at all times to the pressure of the springs **13** materially assists in tying the bolster and side frames in a definite relationship which tends to hold the truck square.

While we have described a specific embodiment of our invention as applied to a railway car truck, it will be apparent that various modifications may be made with respect to the arrangement and form of the main springs, and the friction shoes and the special springs associated with the friction shoes, as well as changes in the construction and subdivision of the bolster, all without departing from the spirit of the invention as defined in the annexed claims.

Having thus described our invention, we claim:

1. In a car truck, a side frame, a hollow bolster resiliently supported in a window of said side frame and having a longitudinal load-supporting wall dividing the same into compartments at each side thereof, friction shoes housed in said compartments with capacity for lateral movement therein, and springs for urging said shoes outwardly and upwardly in frictional engagement with the columns of the side frame and with the top of the bolster, said springs being housed within said shoes with one end of each spring engaging a diagonal seat at the base of said dividing wall and the other end engaging a diagonal seat at the upper and outer corner of a friction shoe, and said bolster having indentations in its lower wall whereby the effective length of the diagonal seats at the dividing wall is increased.

2. In a car truck, a side frame, a hollow bolster resiliently supported in a window of said side frame and having a longitudinal load-supporting wall dividing the same into compartments at each side thereof, friction shoes housed in said compartments with capacity for lateral movement therein, and springs for urging said shoes outwardly and upwardly in frictional engagement with the columns of the side frame and with the top of the bolster, said springs being housed within said shoes with one end of each spring engaging a diagonal seat at the base of said dividing wall and the other end engaging a diagonal seat at the upper and outer corner of a friction shoe and with the intermediate portion confined to axial movement within the shoe, and said bolster having indentations in its lower wall whereby the effective length of the diagonal seats at the dividing wall is increased.

3. In a car truck, a side frame, a hollow bolster resiliently supported in a window of said side frame and having a longitudinal load-supporting wall of inverted Y-shaped section dividing the same into compartments at each side thereof, friction shoes housed in said compartments with capacity for lateral movement therein, and coil springs for urging said shoes outwardly and upwardly in frictional engagement with the columns of the side frames and with the top of the bolster, said springs being housed within said shoes with one end of each spring engaging an inclined surface at the base of said dividing wall and the other end engaging a surface at the upper and outer corner of a friction shoe paralleling the inclined surface aforesaid, and said bolster having indentations in its lower wall whereby the effective length of said inclined surfaces is increased.

4. In a car truck, a side frame, a hollow bolster resiliently supported in a window of said side frame and having a longitudinal load-supporting wall dividing the same into compartments at each side thereof, friction shoes housed in said compartments with capacity for lateral movement therein, and springs for urging said shoes outwardly and upwardly in frictional engagement with the columns of the side frame and with the top of the bolster, said springs being housed within said shoes with one end of each spring engaging a diagonal seat at the base of said dividing wall and the other end engaging a diagonal seat at the upper and outer corner of a friction shoe, and said bolster having indentations in its lower wall extending from the diagonal walls to the sides of the bolster to facilitate the introduction of said springs into said compartments.

5. In a car truck, a side frame, a hollow bolster resiliently supported in a window of said side frame and having vertical walls dividing the bolster into compartments at each side thereof, friction shoes housed in said compartments with capacity for lateral movement therein, and coil springs for urging said shoes outwardly and with a vertical force component into frictional engagement with the columns of the side frames and with the top wall of the bolster, said springs being housed within said shoes with one end of each spring engaging a surface of the bolster inclined at a substantial angle to the direction of movement of the bolster and the other end engaging a surface at an outer corner of a friction shoe paralleling the inclined surface aforesaid, and said springs being so inclined that the vertical force component of said springs is sufficient to hold the friction shoes in contact with the top wall of the bolster.

6. A railway car truck comprising a frame with spaced columns, a bolster spring-supported between said columns, said bolster comprising top and bottom walls and spaced side walls, spring seats formed in said bolster converging from said bottom wall, friction shoe means engaging each column, spaced bearing surfaces on the underside of said top wall adjacent each column and bearing against the associated shoe means, and diagonal springs converging toward said bottom wall and compressed between said seats and respective shoe means for actuation of the latter.

7. A railway car truck comprising a side frame with spaced columns, a bolster spring-supported by said frame between said columns, said bolster being of box section with top and bottom walls, friction shoe means carried by the bolster at each side thereof, spring seats on said bolster converging upwardly from the bottom wall, spring means compressed between the seat and shoe means associated with each column for urging the last-mentioned shoe means against the underside of the bolster top wall and against said column, the compressional axes of the respective spring means converging downwardly toward the longitudinal vertical center line of the bolster.

8. In a friction damping mechanism for a bolster structure spring-supported between spaced columns of a railway car truck side frame; the combination of a compartment in a side of said structure, a rigid surface in said compartment movable with said structure during vertical oscillation thereof, a spring seat in said compartment inclined at a substantial angle to the direction of vertical movement of said structure and movable therewith during normal vertical oscillation thereof, a friction shoe in said compartment having a rigid face seated against said surface and having a spring seat substantially parallel to the spring seat in said compartment, one of said seats being disposed above the other, the shoe spring seat being disposed outwardly of the first-mentioned spring seat, and a coil spring compressed between said seats and housed for a major portion of its length within the shoe for urging said shoe with a vertical force component against the adjacent column, said spring being inclined at such an angle to the direction of vertical movement of said structure that the vertical force component of said spring is effective to maintain the shoe face in engagement with said surface during normal vertical oscillation of said structure.

9. A railway car truck bolster having a box-section end with pockets for friction means at opposite sides thereof, each of said pockets comprising a diagonal web affording a spring seat, and a substantially horizontal web having a pair of spaced rigid ledges affording rigid seats for associated friction shoe means, said ledges defining a passage therebetween for a portion of said shoe means.

10. A railway car truck bolster structure including a hollow end portion having integral side walls and rigid shoe seats extending outwardly toward the sides of the structure, said shoe seats being entirely disposed between the planes of said side walls and being movable as a unit with the structure during normal vertical oscillation thereof, and said structure containing converging spring seats in said portion entirely disposed between said planes and movable as a unit therewith during normal vertical oscillation thereof, each of said shoe seats facing one of said spring seats, in alignment therewith, and arranged at an acute angle thereto.

11. A railway car truck comprising a side frame with spaced columns, a bolster spring-supported by said frame between said columns, said bolster being of box section with top and bottom walls, spaced side walls connected therebetween, a center rib connected between said top and bottom walls, openings in respective side walls defining friction shoe pockets, friction shoe means in each pocket comprising an inner spring seat and an outer friction area engageable with the adjacent column, spring seats within the bolster connected between the bottom wall and each side of the center rib and converging upwardly from the bottom wall, each of the last-mentioned spring seats being approximately parallel to the spring seat of the adjacent friction shoe means, and spring means compressed between each bolster spring seat and the spring seat of the adjacent friction shoe means for urging the latter upwardly against the underside of the bolster top wall and outwardly against the related column, the compressional axes of said spring means converging downwardly toward the longitudinal vertical center plane of the bolster.

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