Jan 6, 1931. C. J. NASH 1,787,588

SHOCK ABSORBER

Filed Oct. 31, 1927 2 Sheets-Sheet 1

Fig. 1

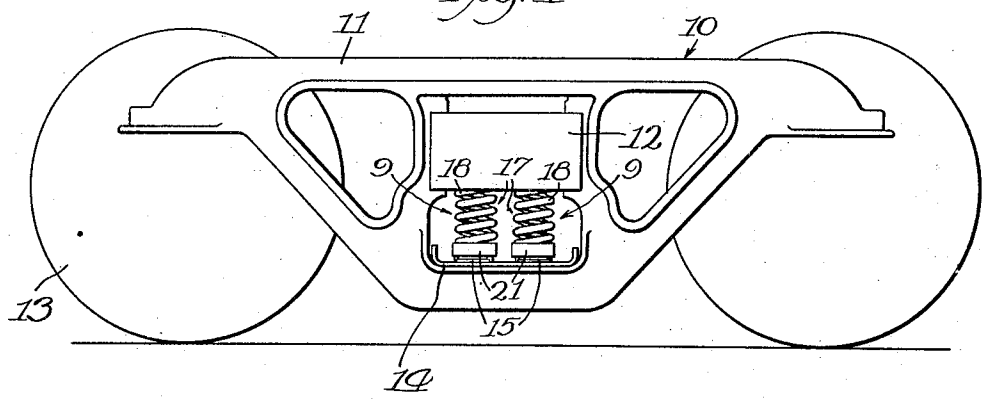


Fig. 2

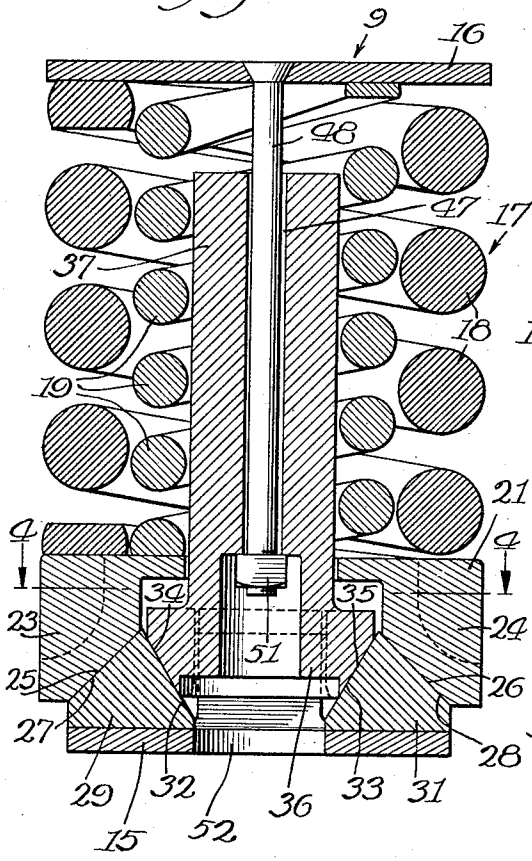
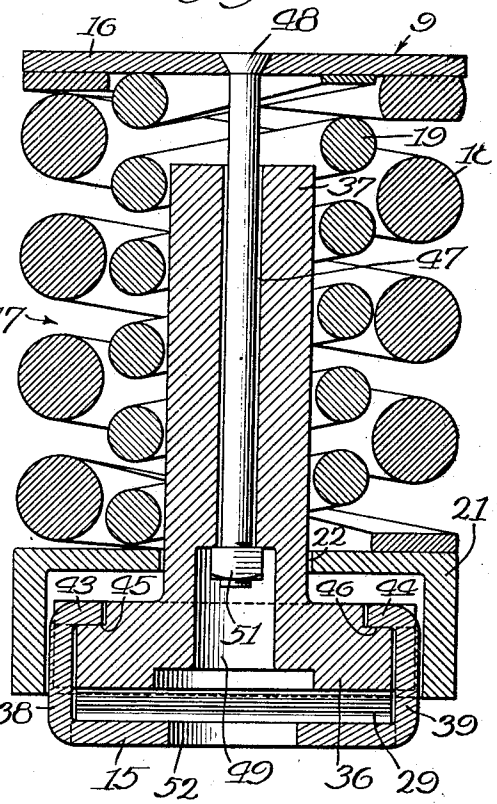


Fig. 3



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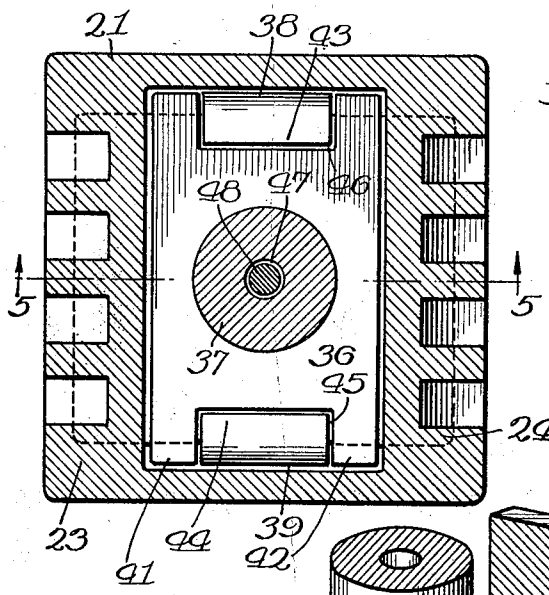


Fig.4

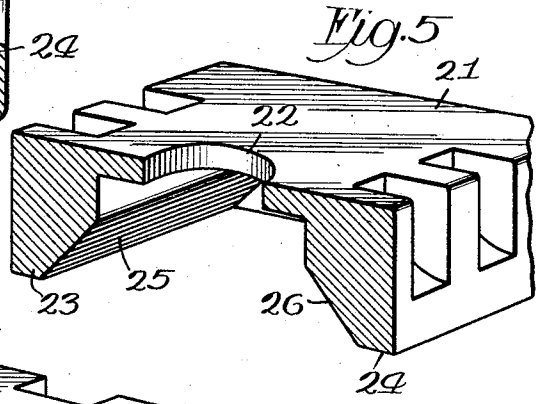


Fig.5

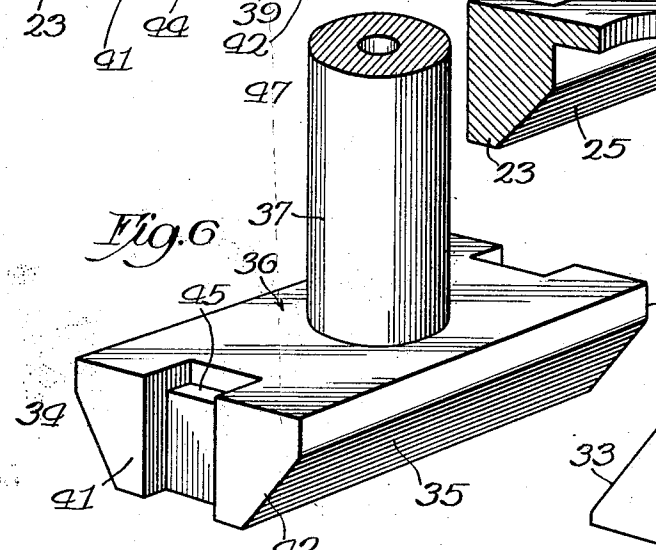


Fig.6

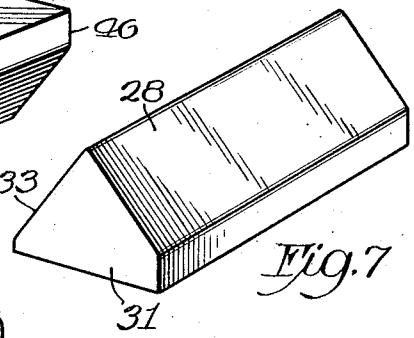


Fig.7

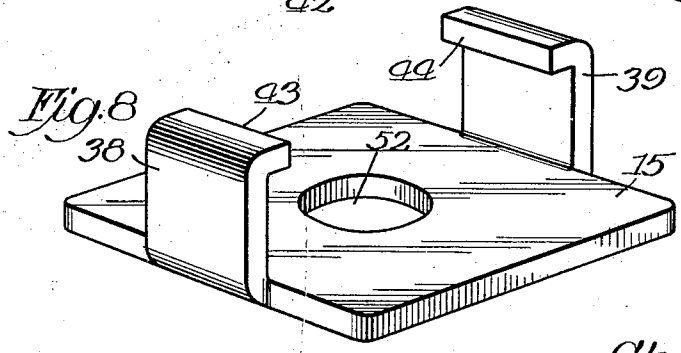


Fig.8

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Patented Jan. 6, 1931 1,787,588

UNITED STATES PATENT OFFICE

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SHOCK ABSORBER

Application filed October 31, 1927. Serial No. 229,890.

This invention relates to shock absorbers for railway cars and the like.

One of the objects of the invention is the provision of new and improved means for frictionally resisting the relative movements of two members by compression.

Another object of the invention is the provision of a combined spring and friction element forming a complete unit that is adapted to be substituted for a compression spring in various relations.

A further object of the invention is the provision of new and improved shock absorbing mechanism that will provide an initial resilient resistance to the compression of said mechanism and a combined resilient and frictional resistance to the further compression of said mechanism.

Another object of the invention is the provision of a shock absorbing mechanism that is cheap to manufacture, easily assembled, simple in construction, efficient in operation, composed of few moving parts, and that is not likely to become broken or get out of order.

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

Fig. 1 is a side elevation of a railway car truck shown more or less diagrammatically with the invention in position thereon;

Fig. 2 is a vertical section of one of the car supporting units;

Fig. 3 is a similar view, but taken at right angles to that shown in Fig. 2;

Fig. 4 is a section on line 4—4 of Fig. 2;

Fig. 5 is a vertical section of the spring seat taken on the line 5—5 of Fig. 4;

Fig. 6 is a perspective view of the thrust member, with parts in section;

Fig. 7 is a perspective view of one of the wedge members; and

Fig. 8 is a perspective view of the supporting plate.

For the purpose of illustrating one embodiment of the invention, which is by way of example only, the same is shown as applied to a railway truck for supporting a railway car body.

In the construction of railway cars it is the common practice to support the body from the trucks by groups of spiral springs the combined capacity of which is designed to be greater than the designated load capacity of the car.

It has been found by experience that the car body, especially when loaded to its capacity, will sometimes vibrate vertically due to the irregularities in the road bed or the eccentricity of the wheel tread and the like, thus causing the coils of the springs to close or go solid. When the coils of the supporting springs close the springs become solid columns that transmit the shocks directly to the truck frames with the result that often the frames are broken or at least seriously injured. Furthermore, undue vertical vibration of the car often causes the truck or trucks to "jump" the tracks.

The present invention seeks to eliminate these difficulties by providing a combined resilient support and shock absorber for yieldingly supporting the car body on the trucks and for absorbing the shocks and preventing undue vibration of the car body during the movement of the car.

Referring now to the drawings in which similar reference characters are employed to designate the same parts throughout the description, the reference character 10 designates generally a car truck comprising the side frame 11, the truck bolster 12 and the supporting wheels 13, all of which may be of the usual or any well known construction.

In the conventional form of railway trucks the bolster 12 is supported from the truck by means of spiral springs interposed between said bolster and the spring plank 14. The present invention comprises a supporting or resilient shock absorbing unit designated generally by the reference character 9 which is adapted to be substituted for one of these springs. In practice a unit 9 may be substituted for each of the spiral springs that support the bolster 12 at each side of the truck.

The supporting unit comprises a lower supporting plate 15 and an upper supporting plate 16 between which is mounted the resilient car supporting means 17 comprising the

outer coil spring 18 and the inner coil spring 19 of the usual or any well known construction.

In order to prevent undue vibration of the loaded car and to prevent injury to the truck frame when the coils of the spring close or go solid under the vibration of the loaded car, suitable shock absorbing means are inserted between these springs and one of the supporting plates. As shown on the drawing, shock absorbing or friction members are inserted between the lower supporting plate and the springs 18 and 19. The shock absorbing means comprises a spring seat 21 having an opening 22 and the downwardly extending projections 23 and 24 at the ends thereof. The projections 23 and 24 are provided on their inner sides with inclined surfaces 25 and 26 which are adapted to engage the inclined faces 27 and 28 of the wedge members or blocks 29 and 31 respectively.

The wedge blocks 29 and 31 are provided on their inner surfaces with inclined faces 32 and 33 which are adapted to engage corresponding inclined faces 34 and 35 of the thrust member 36. The thrust member 36 is provided with a stem 37 extending upwardly therefrom and axially within the spring 19.

In order to limit the upward movement of the thrust member, the lower supporting plate 15 is provided with a pair of upwardly extending projections or arms 38 and 39 which are adapted to engage between lugs 41 and 42 at each end of the thrust member 36. The upper ends of the projections 38 and 39 are provided with inwardly extending flanges 43 and 44 for engaging the rabbeted shoulders 45 and 46 on the ends of the thrust member for limiting the upward movement of said member.

Suitable means are provided for holding the parts in assembled relation with the springs 18 and 19 under a slight amount of initial compression. As shown, the stem or projection 37 is provided with an axial bore 47 for receiving the free end of a bolt 48 which extends downward through the upper supporting plate 16. The bore 47 is counterbored as at 49 for receiving the nut 51. Access is had to said nut through an opening 52 in the lower supporting plate 15 in axial alinement with the bore 47. The stem 37 of the thrust member 36 is normally spaced from the plate 16 so that there will be an initial spring movement before the top supporting plate or bolster supporting plate comes into contact with the thrust member 36, thereby permitting a limited movement of the upper supporting plate 16 before it comes into contact with the stem 37.

In the operation of the device the parts are so constructed that the springs alone will support the load but when undue vibration or vertical movement of the load occurs the plate 16 will come into contact with the upper end of the stem 37 and force the same downward, thereby forcing the wedge blocks 29 and 31 outwardly, which in turn will force the spring seat 21 upwardly against the compression of the springs 18 and 19. The resistance of the spring will cause considerable frictional resistance between the frictional or inclined faces of the wedge blocks 29 and 31 and the corresponding inclined faces of the spring seat 21 and thrust member 36. There is also considerable friction developed between the bottom faces of the wedge blocks 29 and 31 and the lower supporting plate 15. The combined frictional resistance between these surfaces will dampen or absorb the shocks incident to the vertical vibration of the car body during the movement of the car. The parts are so constructed that this resistance is sufficient under even abnormal shocks to prevent the entire closing of the coils during the movement of the car.

As shown on the drawings, the inner faces of the wedge blocks 29 and 31, that is, the thrust member engaging faces, are arranged at a different angle from that of the other faces thereof. The angle formed by the outer faces 27 and 28 may be varied as necessary or desirable. By making these faces less acute than as shown the capacity of the unit is increased and vice versa, because the more acute the angle formed by these outer faces with the axis of the gear, the greater will be the resistance between these faces and the inclined faces 25 and 26 of the spring seat 36.

In the form of the device disclosed, the inner faces of the wedge blocks form an angle with the axis of the unit that is more acute than that formed by the outer faces thereof, whereby the wedging action is smooth and efficient and the capacity sufficient for the sizes of the springs. By arranging the outer faces of the blocks at a less acute angle to the axis of the unit than the inner faces thereof, the upward movement of the spring seat will be less than the downward movement of the thrust member during the operation of the device, thereby reducing to a minimum the tendency to close the spring from below. Furthermore, it is desirable that the force exerted inward by the wedge block tending to elevate the thrust member shall be reduced as much as practicable in order that the upward thrust on the thrust member 36, when it is not in engagement with the upper supporting plate 16, shall be reduced to a minimum. By making the angle of the outer faces of the wedge blocks more nearly at right angles to the axis of the gear, this function is accomplished.

Furthermore, by arranging the outer faces of the wedging blocks at a more nearly right angle to the axis of the unit, while it decreases the capacity of the unit, it will take up the wear between the friction surfaces

with a minimum elongation of the springs. With this arrangement a constant distance between the thrust block and base member or lower supporting plate is maintained during the inoperation of the unit.

In assembling the device one of the flanges 43 or 44 of the projections 38, 39 may be and preferably is bent to position after the thrust member 36 is placed in position in the unit.

The dimensions of the unit may be, and preferably are such that when the parts are assembled it may be substituted for the conventional springs in railway trucks and the like without making changes in the construction of those structures.

I claim as my invention:

1. A bolster supporting unit comprising a helical spring, spring seats between which the spring reacts, one of the seats being centrally apertured and having forwardly and outwardly inclined wedge faces, a thrust member housed within the last-named seat and having forwardly and inwardly inclined wedge faces, and a stem projecting through the aperture of such seat and terminating short of the other seat, and wedge blocks interposed between and cooperating with the wedge faces of the spring seat and the thrust member.

2. A combined resilient and shock absorbing unit comprising a base member, double faced wedge blocks seated upon said member, a thrust member having inclined faces for engaging the inner faces of said wedge blocks, a spring seat having inclined faces for engaging the outer faces of said wedge blocks, the outer faces of said blocks being arranged at a less acute angle to the axis of the unit than the inner faces thereof, said thrust member being provided with a stem engaging the seat, and a spring surrounding and normally extending beyond said stem.

3. A combined resilient and shock absorbing unit comprising a base member, wedge blocks engaging said member, a thrust member having inclined faces for engaging the inner faces of said wedge blocks, a spring seat having inclined faces for engaging the outer faces of said wedge blocks, said thrust member having an upwardly extending stem, a spring surrounding said stem and engaging said seat, said stem terminating short of the upper end of said spring, and means for limiting the upward movement of said stem.

4. A cushioning unit comprising a base member, a spring seat having inclined friction surfaces, a thrust member having wedging faces, a plurality of wedge blocks each having wedging faces arranged at different angles for engaging said surfaces and faces, said thrust member having an upwardly extending stem, an upper supporting plate, a coil spring on said stem and engaging said plate and seat, means for limiting the upward movement of said thrust member, and means engaging said seat and plate for holding said spring under initial compression.

In testimony whereof I affix my signature.

CHARLES J. NASH.