CONVENTION APPLICATION FOR STANDARD PATENT OR A STANDARD PATENT OF ADDITION

Full name(s) of Applicant(s)

We BUCKEYE INTERNATIONAL, INC.

of 1205 Dearborn Drive, Columbus, Ohio 43085, United States of America

hereby apply for the grant of a standard patent for an invention entitled

"DAMPING MECHANISM FOR A TRUCK ASSEMBLY"

which is described in the accompanying complete specification.

DETAILS OF BASIC APPLICATION(s)

Number(s) of Basic Application(s)

567,777

Name(s) of Convention Country(ies) in which Basic Application(s) was/were filed

United States of America (respectively)

Date(s) of Basic Application(s)

3 January 1984 (respectively)

APPLICATION ACCEPTED AND AMENDMENTS

ALLOWED

My/Our address for service is:

C/- Spruson & Ferguson
PATENT ATTORNEYS
ST. MARTINS TOWER
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AUSTRALIA

Dated this THIRD day of OCTOBER 1984

BUCKEYE INTERNATIONAL, INC.

By: M.J. Anderson
Registered Patent Attorney
COMMONWEALTH OF AUSTRALIA
THE PATENTS ACT 1952
DECLARATION IN SUPPORT OF A CONVENTION APPLICATION FOR A PATENT

In support of the Convention Application made for a patent for an invention entitled:

"DAMPING MECHANISM FOR A TRUCK ASSEMBLY"

I/WK Dale T. Brinkman, Secretary

of BUCKEYE INTERNATIONAL, INC., an Ohio corporation,
1205 Dearborn Drive
Columbus, Ohio  43085 U.S.A.

do solemnly and sincerely declare as follows:-

1. I am/We are the applicant(s) for the patent

(or, in the case of an application by a body corporate)

1. I am/We are authorised by BUCKEYE INTERNATIONAL, INC.,

the applicant(s) for the patent to make this declaration on
its/their behalf.

2. The basic application(s) as defined by Section 141 of the
Act was/were made

in the United States of America

on January 3, 1984

by JAMES E. SOLOMON

3. I am/We are the actual inventor(s) of the invention referred to in the basic application(s).

(or where a person other than the inventor is the applicant)

3. James E. Solomon

of Route 1, Canal Winchester, Ohio 43110
United States of America

(respectively)

is/are the actual inventor(s) of the invention and the facts upon which the applicant(s) is/are entitled to make the application are as follows:

The Applicant is the assignee of the invention from the inventor.

4. The basic application(s) referred to in paragraph 2 of this Declaration was/were the first application(s) made in a Convention country in respect of the invention(s) the subject of the application.

Declared at Columbus, Ohio U.S.A. this 29th day of August 1984.

BUCKEYE INTERNATIONAL, INC.
By: Dale T. Brinkman, Secretary

To: The Commissioner of Patents
Claim

1. A freight car truck assembly, comprising a pair of spaced side frames supported on wheel assemblies, a bolster opening in each side frame, a bolster having its opposite ends received in respective side frame bolster openings, bolster spring means in each side frame supporting opposite ends of said bolster, each of said side frames having a pair of wedge pockets formed therein on opposite sides of the adjacent bolster end, a pair of friction damping wedges mounted in respective ones of said pockets in each of said side frames, first biasing means biasing said wedges upwardly in said pockets into engagement with opposite sides of said adjacent bolster end, and second biasing means biasing each of said wedges in its pocket toward the outside of the corresponding side frame.
BUCKEYE INTERNATIONAL, INC.

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Actual Inventor(s):
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Complete Specification for the invention entitled:
"DAMPING MECHANISM FOR A TRUCK ASSEMBLY"

The following statement is a full description of this invention, including the best method of performing it known to me/us.
ABSTRACT OF THE DISCLOSURE

A damping mechanism for a truck assembly employing a resiliently mounted wedge to cooperate with a bolster in a manner to prevent wear. The damping assembly is biased outwardly and a friction plate employed between the wedge and bolster, further reducing frictional contact with the side frame.
BACKGROUND OF THE INVENTION

This invention relates to friction snubbed railway trucks and, in particular, to both lateral and vertical damping of what is commonly known as a three piece truck.

Geometrical constraints of past friction snubbed railway truck designs of either constant or variable damping have limited the amount of damping. These geometrical constraints have further limited the amount of truck squaring moment between the main elements of the three piece truck.

Recent three piece truck designs using longer travel springs have aggravated an ever-existing wear problem between the main elements of the three piece truck. This sustained wear problem is caused by light car truck hunting, lack of lateral damping capability at loaded car, loaded car rocking, loaded car pitching and bouncing, or various combinations of these conditions.

The friction snubbing means of a conventional three piece truck is designed primarily to dampen the periodic oscillations of the truck bolster as it vibrates both vertically and horizontally on its supporting springs in respect to the two side frames during normal operation. The limit cycle of the vertical oscillations is the solid spring condition of the bolster support springs. This condition is not uncommon in underdamped trucks. The limit cycle of the lateral oscillations of the truck bolster is the contacting
of the bolster gibs with the side frame columns. This condition appears normally at the contact of the bolster inner gibs with the inside surfaces of the side frame columns. Truck hunting and excessive vertical car bouncing promote rapid wear of the relatively soft cast steel parts at this element interface.

In addition, known three piece truck designs utilize snubbing structures that possess lesser dimensions in the horizontal direction than in the vertical direction. These narrower dimensions of past snubbing means do not give adequate squaring moment capabilities, an adverse problem especially apparent on variable damped trucks.

Due to geometrical constraints previously mentioned, some past designs of constant damped trucks do not have the elements of the damping mechanism in full friction face contact at all positions of bolster travel. Thus, the unit pressure between the friction elements is variable and at some conditions of bolster travel, the resulting higher unit pressure promotes more rapid wear of the friction elements.

**SUMMARY OF THE INVENTION**

It is, therefore, an object of this invention to provide a novel damping mechanism for improved truck squaring and reduced wear in a three piece railcar truck assembly. Another object of the invention is to provide a damping mechanism capable of reducing wear of the friction elements of a truck assembly.
It is therefore the object of the present invention to overcome or substantially ameliorate the abovementioned problems.

There is disclosed herein a freight car truck assembly, comprising a pair of spaced side frames supported on wheel assemblies, a bolster opening in each side frame, a bolster having its opposite ends received in respective side frame bolster openings, bolster spring means in each side frame supporting opposite ends of said bolster, each of said side frames having a pair of wedge pockets formed therein on opposite sides of the adjacent bolster end, a pair of friction damping wedges mounted in respective ones of said pockets in each of said side frames, first biasing means biasing said wedges upwardly in said pockets into engagement with opposite sides of said adjacent bolster end, and second biasing means biasing each of said wedges in its pocket toward the outside of the corresponding side frame.
Brief Description of the Drawings

A preferred form of the present invention will now be described by way of example with reference to the accompanying drawings, wherein:

FIG. 1 is a side elevational view of a freight car truck assembly having a damping mechanism constructed in accordance with the present invention;

FIG. 2 is an enlarged fragmentary vertical sectional view illustrating the damping mechanism of the present invention;

FIG. 3 is an enlarged fragmentary horizontal sectional view taken approximately along the line 3-3 of FIG. 1;

FIG. 4 is an enlarged detail elevational view of a wedge member which is a component of the damping mechanism of FIG. 3;

FIG. 5 is a top view of the wedge of FIG. 4 taken along line 5-5 of FIG. 4;

FIG. 6 is an opposite side view taken along line 6-6 of FIG. 5; and
FIG. 7 is an alternate embodiment of the snubbing arrangement shown in Fig. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to Figs. 1-6, there is illustrated a first embodiment of the damping mechanism of the invention which is designed for snubbing the relative movement of a pair of elements of a truck assembly of a railway car, namely a bolster with respect to its side frames, in any and all possible directions. The particular embodiment shown in Figs. 1-6 provides for generally equal damping in each lateral direction while providing for an increased vertical damping of the bolster in its downward motion as opposed to its vertical damping capacity when the bolster is in upward motion. Although such damping has been partially provided in the past, the improvements over these known designs made possible by the invention of the application will become apparent from the following description.

Referring to Fig. 1, there is illustrated the side frame member 2 of a railway car truck. Frame member 2 includes a compression member 4 and a tension member 6, respectively, interconnected by vertical columns 8. A bolster opening 10 is arranged to receive a bolster 12 between columns 8. The bolster is supported on a spring group 16 which rests on top of tension member 6.

The bolster 12 includes an upper wall 20 and a lower wall 22 along with a pair of side walls 24, 26, as seen in Figs. 1 and 2. Hardened steel wear plates 30 are
fixedly attached to the bolster 12 in suitable pockets provided between bolster gib 32 and 34 (Fig. 3) and "friction wedges 40 which are retained in biased pockets 40' within the side frame 2. As seen in Fig. 2, the wedge 40 is urged upwards and against the side walls of the side frame by means of a spring 42 suitable mounted on a spring seat 44. The wedge 40 includes a back surface 46 which is urged against the pocket surface 48 and a side surface 50 which is arranged to bear against an inner surface 52 of the side frame as illustrated in Fig. 2 and Fig. 3. A third surface 54 of the wedge bears against the wear plate 30 to dissipate energy during motion of the bolster. The wedges 40 are positioned on each side of the bolster 12 and generally have a hollow design forming the respective outer surfaces 46, 50, and 54 as most clearly shown in Figs. 2-6.

The wall 48 of the wedge pocket is sloped toward the outside of the frame 2 and provides a biased surface to bias the wedge 40 to the outside. The wedge 40, thus, is held in its normal position by forces in four directions, namely, the spring force created by springs 42, the normal reaction between the surface 46 of the wedge and the surface 48 of the frame, the normal reaction between the wedge surface 50 and surface 52 of the frame, as best illustrated in Fig. 3, and, finally, the normal reaction between the surface 54 of wedge 40 and the outer surface of wear plate 30. As the bolster 12 goes up and down on the load springs 16, energy is dissipated by frictional contact between the surface 54 of the wedge 40 and the wear plate 30 on each side of the bolster.
As stated previously, the highest degree of wear in prior art trucks which is detrimental to service life is at the innerface between the bolster inner gib 32 and the side frame column. In prior art trucks, the inner side frame column is extended close to the bolster between the gibs and lateral loads are reacted into the side frame column by the inner gibs. This is a place of rapid wear in common designs; but in the invention herein disclosed, the inner side frame column is relieved such that gib 32 reacts its lateral load into the wedge 40, thus eliminating contact between the inner side frame column and gib 32.

To prevent wear of the bolster inner gib 32, a flange 60 is provided on the wear plate 30 and substantially resolves the problem of wear.

Since the biased wedge 40 of the invention does not move laterally in the embodiments shown in Figs. 1-6, wear is reduced on the back wall 48 of the side frame.

The damping mechanism of the invention permits wider wedges than previous designs, which when being urged into position with stronger than normal elastic means, increases damping and provides truck squaring moments not previously possible. This increase in the lateral wedge width and its retention also provides for increased damping in the lateral direction.

Referring to Fig. 7, there is illustrated another embodiment of the invention wherein the damping mechanism 60 includes wedges 62 resiliently urged and reversed in
orientation placing the friction wedge into biased pockets within the bolster. The mechanism 60 reacts to the lateral loads through wedges 62 to shaped wear plates which are housed in suitable pockets in the side frame columns.

While the invention has been described with reference to preferred embodiments, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the invention. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the invention without departing from the essential scope thereof. Therefore, it is intended that the invention not be limited to the particular embodiments disclosed as the best mode contemplated for carrying out this invention, but that the invention will include all embodiments falling within the scope of the appended claims.
The claims defining the invention are as follows:

1. A freight car truck assembly, comprising a pair of spaced side frames supported on wheel assemblies, a bolster opening in each side frame, a bolster having its opposite ends received in respective side frame bolster openings, bolster spring means in each side frame supporting opposite ends of said bolster, each of said side frames having a pair of wedge pockets formed therein on opposite sides of the adjacent bolster end, a pair of friction damping wedges mounted in respective ones of said pockets in each of said side frames, first biasing means biasing said wedges upwardly in said pockets into engagement with opposite sides of said adjacent bolster end, and second biasing means biasing each of said wedges in its pocket toward the outside of the corresponding side frame.

2. The assembly of Claim 1 where said first biasing means comprises a compression spring.

3. The assembly of Claim 1 where each wedge pocket has a back wall which is inclined away from the adjacent bolster end as said wall extends toward the inside of said side frame, said first biasing means urging its corresponding wedge against said inclined back wall and said inclined back wall biasing said wedge in its pocket toward the outside of the corresponding side frame.

4. The assembly of Claim 1 where said bolster includes projecting gib means on opposite sides of each bolster end, said gib means each being positioned immediately inside of a corresponding one of said wedges thereby a lateral load on said bolster directed to the outside of one of said side frames will be transferred from said bolster through said gib means to the pair of wedges in said one side frame whereby said wedges will transfer said load to said side frame.

5. The assembly of Claim 4 where a wear plate is mounted on each of said gib means on the outside facing the corresponding wedge.

6. A freight car truck assembly, comprising a pair of spaced side frames supported on wheel assemblies, a bolster opening in each side frame, a bolster having its opposite ends received in respective side frame openings, bolster spring means in each side frame supporting said opposite ends of said bolster, each of said frames having a pair of wedge pockets formed therein on opposite sides of the adjacent end, said pockets each having a back wall inclined to make the pocket narrower at its upper end, said back wall also being inclined away from the adjacent bolster end as said wall extends toward the outside of said side frame, a pair of friction damping wedges mounted in respective ones of said pockets in each of said
side frames, wedge spring means biasing said wedges upwardly in said pockets into engagement with opposite sides of said adjacent bolster end and also into engagement with said back wall, said inclined back wall biasing said wedge in its pocket toward the outside of the corresponding side frame.

7. The assembly of Claim 6 where said bolster includes projecting gib means on opposite sides of each bolster end, said gib means each being positioned immediately inside of a corresponding one of said wedges whereby a lateral load on said bolster directed to the outside of one of said side frames will be transferred from said bolster through said gib means to the pair of wedges in said one side frame whereby said wedges will transfer said load to said side frame.

8. The assembly of Claim 7 where a wear plate is mounted on each of said gib means on the outside facing the corresponding wedge.

9. A freight car truck assembly as hereinbefore described with reference to the accompanying drawings.

DATED this THIRTEENTH day of APRIL 1987
BUCKEYE INTERNATIONAL INCORPORATED

Patent Attorneys for the Applicant
SPRUSON & FERGUSON