Aug. 23, 1932. C. K. BROOKS ET AL 1,872,881

SHOCK ABSORBING MECHANISM

Original Filed Aug. 4, 1925

*Fig. 1.*

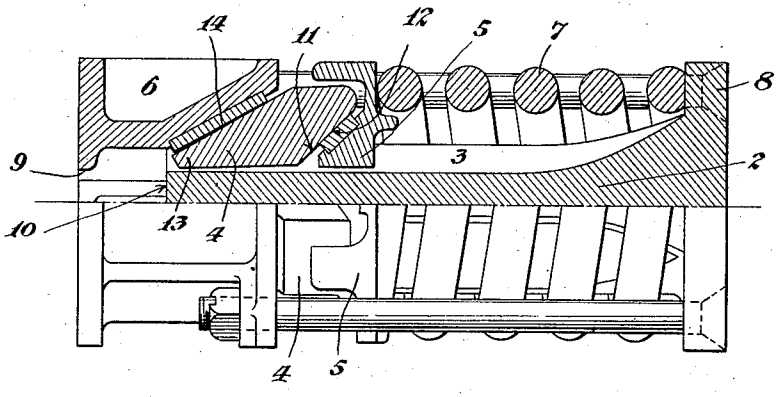



*Fig. 2.*

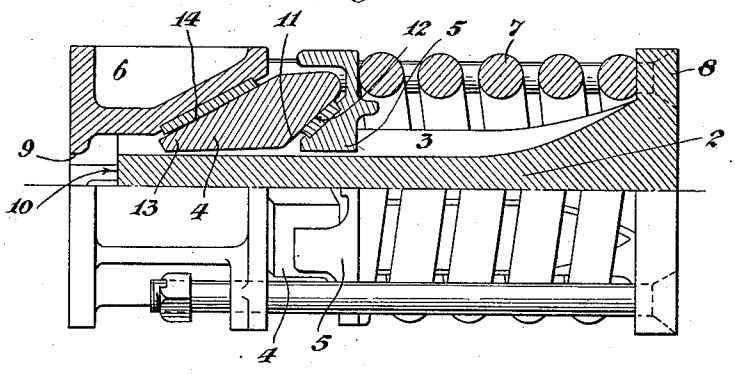
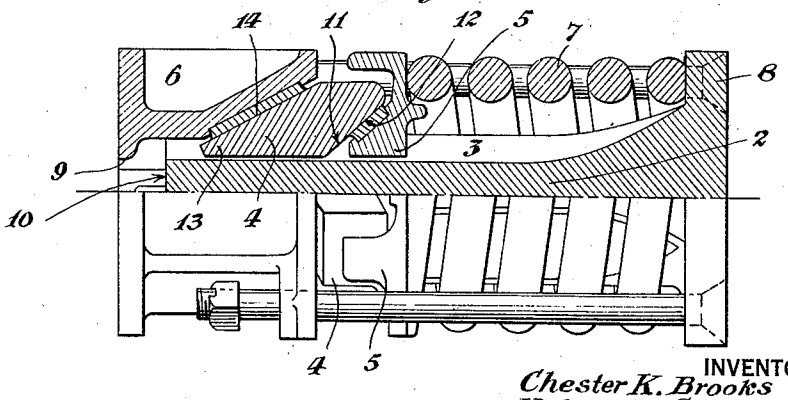



*Fig. 3.*




INVENTORS
Chester K. Brooks
Hubert L. Spence
BY
Clarence A. Kerr
ATTORNEY

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# UNITED STATES PATENT OFFICE

CHESTER K. BROOKS, OF MENTOR, AND HUBERT L. SPENCE, OF CLEVELAND, OHIO, ASSIGNORS TO NATIONAL MALLEABLE AND STEEL CASTINGS COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO

## SHOCK ABSORBING MECHANISM

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Fig. 1 is an elevation, half in section, showing the application of our invention to a draft gear for railway vehicles and showing the parts in released position; Fig. 2 is a view similar to Fig. 1, but with the parts partially compressed from a light buffing blow; and Fig. 3 is a view similar to Figs. 1 and 2, but with the parts partially compressed from a sudden comparatively heavy blow.

Our invention relates to shock absorbing mechanism and is particularly applicable to draft gears for railway vehicles. In draft gears of the type such as are shown in the Schmidt Patent No. 1,510,016, dated September 30, 1924, we have found that particularly with light buffing blows and surges the high capacity of the gear gives a resistance to such blows of such a character as to make the gear seem practically rigid. We overcome this difficulty in our present invention by providing a mechanism which is sensitive to lighter blows and which at the same time has sufficient frictional capacity to take care of heavy blows such as occur in coupling operations and in sudden starting and stopping. Our invention also comprises various features which we shall hereinafter describe and claim.

Referring to the drawing, the central friction member 2 has outwardly extending diverging friction surfaces 3 intended to be engaged by the friction shoes 4. The friction shoes 4 at their inner ends bear against an intermediate wedge follower 5 and at their outer ends against a wedge follower 6. Encircling the central friction member 2 is a compression spring 7 which at its ends bears against the intermediate follower 5 and a rear follower 8, which may be the base of the central friction member 2.

The wedge 6 has a central aperture 9 through which the end of the central friction member moves into engagement with a front follower (not shown) just before the spring 7 goes solid so that over solid blows are thus taken up directly from the central member 2 by the front follower (not shown) and the various parts of the friction mechanism and spring are thereby protected from injury.

To provide for a variable cushioning effect to render the gear sensitive to the lighter blows and surges which are continually taking place while the train is in motion, we have cut away the rear faces 11 of one or more of the shoes 4 and have formed the cooperating faces 12 of the intermediate follower 5 correspondingly, so that the faces 12 are preferably at an angle of between 35° to 45° measuring from a line perpendicular to the center line of the gear.

After compression and release of the gear, the bearing of the forward angled faces 12 of the intermediate follower 5 against the corresponding inclined rear face 11 of the friction shoe 4 tips the rear end of the friction shoe 4 away from friction faces 3 of the central member 2 into the position shown in Fig. 1, in which the shoe 4 is in contact with the faces 3 of the central member 2 only at its narrow outer end 13. If with the shoe or shoes in the position shown in Fig. 1, a light blow or push is transmitted through the follower wedge 6, the pressure of the spring supported intermediate follower 5 against the rear end of the shoe or shoes 4, holds it or them away from the central friction member 2 until the gear is part way closed, thus preventing any substantial frictional engagement between the shoes 4 and friction member 2 during the initial portion of the travel of the gear, as is shown in Fig. 2, so that in effect light blows are resisted principally by the spring 7 and not by the frictional elements.

As the wedge 6 is driven back, it, however, has a tendency to ride up the shoes 4 so that while initially a blow may not be hard enough to cause the shoes 4 to grip the frictional faces 3 of the member 2, the continuation of the pressure will cause the wedge 6 to force the shoes 4 into engagement with the frictional faces 3 of the member 2 and thereafter during the remainder of the compressive movement, the gear will have its normal frictional capacity.

When, however, the parts are in the released position of Fig. 1, with the rear ends of the shoes 4 standing away from the friction member 2, and the gear receives a sudden hard blow so that the follower wedge 6 will start

quite suddenly into relatively rapid movement, the shoes 4, due to their inertia, offer a momentary resistance which is sufficient to cause the follower wedge 6 to be driven up over the wedging faces of the shoes 4. This action clamps the shoes 4 tightly against the central member 2 before the shoes 4 can move longitudinally to an appreciable distance. Thus the gear when the blows are sufficiently quick and powerful will begin to develop frictional capacity from the outset of movement and its normal high frictional capacity willl be attained in the usual way.

In testing our improved gear under a drop test, we have found that with certain angles the gear actually compresses less when a 9000 pound weight is dropped from a height of three inches than when it is dropped one inch. The reason for this is that with a three inch drop the blow is sufficient to develop the frictional capacity, while with a one inch drop the movement of the follower wedge, because the shoes are held away from the central member, is resisted practically only by the spring.

The terms and expressions which we have employed are used as terms of description and not of limitation, and we have no intention, in the use of such terms and expressions, of excluding any mechanical equivalents of the features shown and described, or portions thereof, but recognize that various structural modifications are possible within the scope of the invention claimed.

What we claim is:

1. In a shock absorbing mechanism, a main longitudinally extending friction member; friction shoes arranged to engage said friction member and to move longitudinally thereto; a wedge engaging the shoes; a compression spring arranged between a bearing rigid with the said member and an intermediate element; the intermediate element engaging said shoes at an angle sufficiently sharp to lift the shoes out of substantial engagement with the friction member during release and to maintain such disengaged condition during light buffing blows.

2. In a shock absorbing mechanism, a main longitudinally extending friction member; friction shoes arranged to engage said friction member and to move longitudinally thereto; a wedge engaging the shoes; a compression spring arranged between a bearing rigid with the said member and an intermediate element; the intermediate element normally engaging at least one of said shoes at an angle sufficiently sharp with regard to the axis of the member to tilt the said shoe out of substantial frictional engagement with the said friction member during release; the said engagement between shoes and the intermediate element being arranged to maintain the shoe out of substantial engagement with the friction member during a substantial part of the compressive stroke under light buffing blows.

3. In a shock absorbing mechanism, a main longitudinally extending friction member; friction shoes arranged to engage said friction member and to move longitudinally thereto; a wedge engaging the shoes; a compression spring arranged between a bearing rigid with the said member and an intermediate element; the intermediate element normally engaging at least one of said shoes at an angle sufficiently sharp with regard to the axis of the member to tilt the said shoe out of substantial frictional engagement with the said friction member during release; the said engagement between shoes and the intermediate element being arranged to maintain the shoe out of substantial engagement with the friction member during a substantial part of the compressive stroke under light buffing blows; and the wedge comprising means for forcing the shoes into frictional engagement with said friction member without appreciable longitudinal movement of the shoes under impact of a sudden heavy buffing shock.

4. In a shock absorbing mechanism, a central friction member having a plurality of longitudinally extending frictional faces; friction shoes arranged to engage said frictional faces and to move longitudinally thereto; a wedge engaging the shoes; a compression spring arranged between a bearing rigid with the said member and in intermediate element; the intermediate element normally engaging at least one of said shoes at an angle sufficiently sharp with regard to the axis of the member to tilt the said shoe out of substantial frictional engagement with the said frictional faces during release; the said engagement between shoes and the intermediate element being arranged to maintain the shoe out of substantial engagement with the frictional faces during a substantial part of the compressive stroke under light buffing blows; and the wedge comprising means for forcing the shoes into frictional engagement with said frictional faces without appreciable longitudinal movement of the shoes under impact of a sudden heavy buffing shock.

5. A friction shock absorbing mechanism comprising a wedge, spring and friction members, certain of said friction members due to their inertia being adapted to be forced by the wedge into frictional contact with others of said friction members to develop frictional resistance in response to a rapid blow, said spring member opposing relative longitudinal movement of certain of the friction members and means including inclined surfaces on certain of said friction members for normally holding said members away from said other friction members.

6. In a shock absorbing mechanism, a plu-

rality of friction members, certain of said members being in frictional engagement with each other; a wedge engaging some of said members; means including inclined surfaces on certain of said friction members for holding some of said members out of engagement with another of the friction members under slow compression of the mechanism and forcing said members into full frictional engagement under rapid compression of the mechanism.

7. In a shock absorbing mechanism, a longitudinally extending friction member; friction shoes arranged to engage the friction member and to move longitudinally with respect thereto; a wedge engaging the shoes; and a spring opposing relative longitudinal movement between said shoes and member; means including inclined surfaces on certain of said friction shoes for holding the shoes partially out of engagement with the friction member under slow compression of the mechanism and forcing the shoes into full frictional engagement with the friction member under rapid compression of the mechanism.

8. A friction shock absorbing mechanism comprising a wedge, and friction members, certain of said friction members due to their inertia being adapted to be forced by the wedge into frictional contact with the others of said friction members to develop frictional resistance in response to a rapid blow and means counteracting the wedging engagement of the wedge upon certain of said friction members, said means acting to reduce the frictional resistance of said friction members under light blows.

9. A friction shock absorbing mechanism which comprises cooperating spring and friction members, wedging means engaging some of the friction members and adapted to force them into engagement with other of said members, and means urged by said spring for normally holding the cooperating faces of said wedging means and said some of the friction members at an angle whereby to develop substantially only spring resistance under slow compression and both spring and frictional resistance under rapid compression.

CHESTER K. BROOKS.
HUBERT L. SPENCE.