Aug. 2, 1932. J. F. O'CONNOR 1,869,578

SHOCK ABSORBING MECHANISM

Filed July 27, 1928

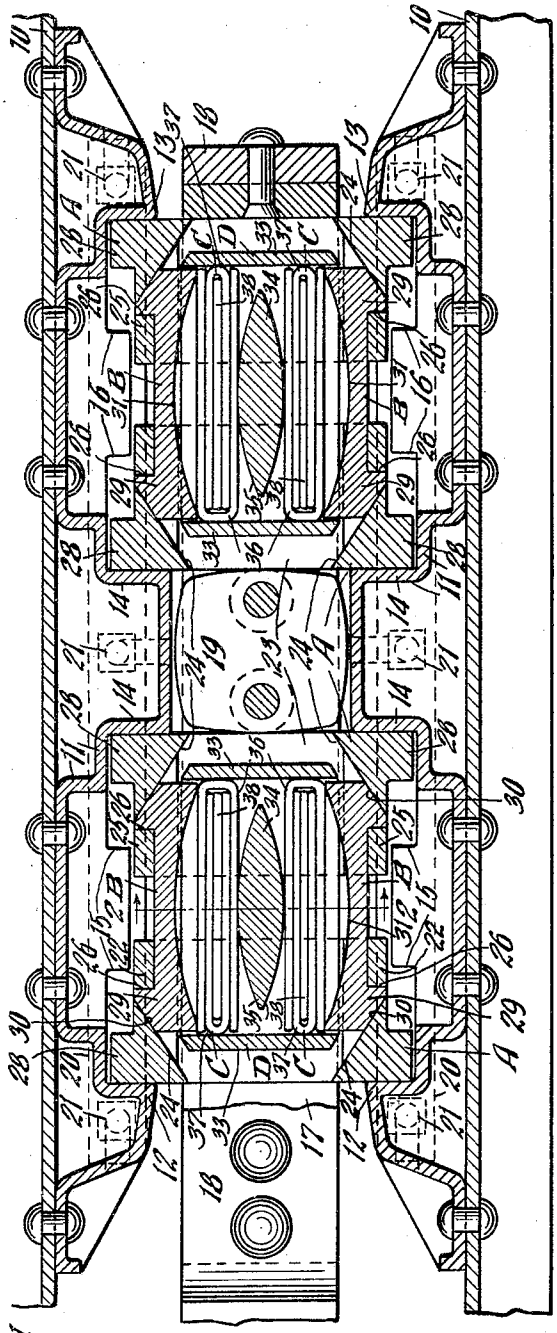

Fig. 1

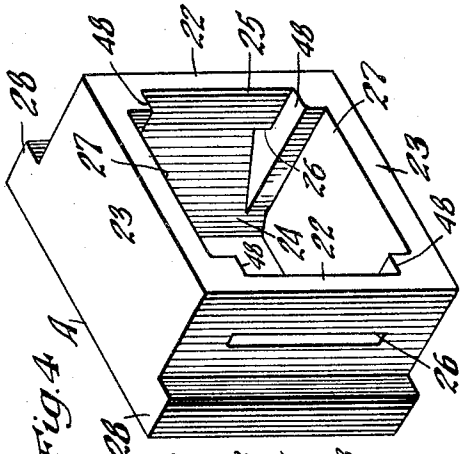

Fig. 4

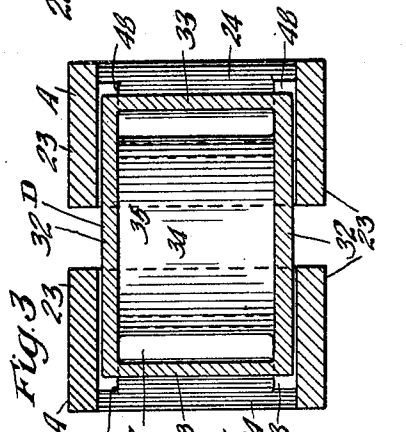

Fig. 3

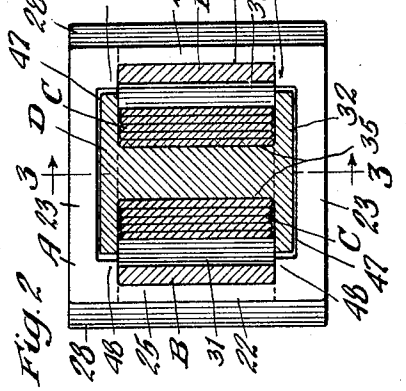

Fig. 2

Witness
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UNITED STATES PATENT OFFICE

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SHOCK ABSORBING MECHANISM

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This invention relates to improvements in shock absorbing mechanisms.

One object of the invention is to provide a shock absorbing mechanism for railway draft riggings having the usual stop castings arranged for spring draft gears of the tandem spring type, including front and rear shock absorbing units, adapted to be operated in tandem by the type of yoke means commonly employed with tandem spring gears, wherein each shock absorbing unit includes end followers movable toward and away from each other, side members having wedging engagement with the followers, and a pair of laminated plate springs interposed between the side members and flexed upon relative approach of the latter to absorb the shocks, the laminated plate springs being separated by a spacing member having bearing surfaces on opposite sides thereof, cooperating with the laminated plate springs.

Another object of the invention is to provide a shock absorbing unit of the character indicated, including a pair of end followers movable toward and away from each other, two laminated plate spring members interposed between the followers, a supporting carrier for said springs provided with a central partition wall spacing apart the two spring members, and laterally movable side members having wedging engagement with the followers, to be forced laterally inwardly upon relative approach of the followers, to compress and flex said laminated spring members to absorb the shocks, the opposite side walls of the side members and the partition wall being provided with curved bearing surfaces between which the plate springs are flexed, wherein resistance, in addition to that offered by the plate springs, is had, due to the relative slippage of the cooperating wedge faces of the followers and side members.

A still further object of the invention is to provide a shock absorbing unit adapted for use in connection with tandem spring side castings of railway draft riggings, including relatively movable followers, longitudinally disposed spring plates interposed between the followers, side members having wedging engagement with the followers and forced laterally inwardly by said followers during relative approach thereof, to flex the spring plates, wherein the spring plates are mounted in a carrier and are held against endwise displacement with respect to the carrier to protect the parts of the mechanism against damage by the raw ends of the plates.

A still further object of the invention is to provide a laminated plate spring for railway draft gears including a plurality of nested plates, including a flat plate spring enclosed by interengaged U-shaped spring members, whereby a spring unit is provided wherein the raw edges of the plates are held out of contact with the cooperating gear parts to protect the same against damage.

Other and further objects of the invention will more clearly appear from the description and claims hereinafter following.

In the drawing forming a part of this specification, Figure 1 is a horizontal, longitudinal sectional view of a portion of a railway draft rigging illustrating my improvements in connection therewith. Figure 2 is a vertical, transverse sectional view through one of the shock absorbing units, corresponding substantially to the line 2—2 of Figure 1. Figure 3 is a vertical, longitudinal sectional view, corresponding substantially to the line 3—3 of Figure 2. And Figure 4 is a detailed perspective view of one of the end followers employed in connection with my improved mechanism.

In said drawing, 10—10 indicate the usual channel-shaped center or draft sills of a railway car underframe, to the inner sides of which are secured side plates or stop castings 11—11, commonly employed in connection with spring draft riggings of the tandem type and in connection with which my improved shock absorbing mechanism is particularly designed for use. The castings 11 have the usual front stop shoulders 12—12, rear stop shoulders 13—13, intermediate or middle main stop shoulders 14—14, front limiting stop shoulders 15—15 and rear limiting stop shoulders 16—16. The inner end of the draw-bar is designated by 17, to which is operatively secured a yoke 18 of the well known type

employed in connection with tandem spring gears. The yoke is provided with a central filler block 19 secured to the top and bottom members of the yoke by vertically disposed rivets. The shock absorbing means proper of my improved mechanism are disposed within the front and rear openings of the yoke. The side castings 11 are also provided with supporting plates 20—20 secured to the bottom sides thereof, which support the shock absorbing means in a manner hereinafter pointed out. The supporting guide plates 20 are preferably secured to the castings 11 by means of the usual bolts 21—21, the heads of which are disposed within suitable openings in the castings, the castings being slotted, as indicated, to permit assembling of the bolts therewith.

My improved shock absorbing mechanism proper comprises, broadly, two shock absorbing units arranged in tandem, each unit including two end followers A—A; two side members B—B; two laminated plate springs C—C; and a carrier D.

The end followers A of each unit are of similar design, each being in the form of a substantially rectangular box-like casting, open at the opposite ends and having spaced, vertically disposed side walls 22—22, horizontally disposed, spaced top and bottom walls 23—23. The side walls are provided with inwardly diverging friction wedge faces 24—24 at the outer ends of the casings and straight wall sections 25—25 inwardly thereof, the spaced wall sections 25 presenting transverse abutment faces 26 for a purpose hereinafter described. As clearly shown in Figures 1 and 4, a vertical opening is left between the friction wedge faces and the end wall sections of the side walls of the followers A. The top and bottom walls 23 of each casing A are cut away interiorly, as indicated at 27—27, thereby providing supporting ledges 48—48 at opposite sides of the casing at the top and bottom thereof. At the outer end, the side walls of each casing are provided with relatively heavy vertical flanges 28—28, which cooperate with the corresponding stop shoulders of the castings 11 in the manner of the usual follower.

The side members B of each unit are of similar design and are arranged on opposite sides of the mechanism. Each side member B comprises a relatively heavy plate-like section provided with lateral outward extensions 29—29 at the opposite ends thereof. The extensions 29 are provided with wedge friction faces 30—30 which cooperate respectively with the wedge faces 24 of the two end followers of the unit, which are disposed at the same side of the mechanism. The extensions 29 have shouldered engagement with the abutment faces 26 of the casings A in the normal full release position of the parts, thereby limiting outward separation of the casings longitudinally of the mechanism.

The members B are of such a height as to fit between the ledges 48 of the casings A and are directly supported by the bottom ledges. On the inner side, each member B is provided with a concave bearing surface 31, adapted to cooperate with one of the laminated plate springs C in a manner hereinafter pointed out.

The carried D of each unit is in the form of a casing open at opposite sides and having horizontally disposed, spaced top and bottom walls 32—32 and vertical end walls 33—33. The casing is of such a width as to fit within the openings 27 at the top and bottom sides of the casings and be guided by the side edges of the ledges 48. The top and bottom walls of the casing embrace the inwardly projecting portions of the side members B and the front and rear walls 33 of the carriers are spaced apart such a distance as to loosely accommodate the members B therebetween.

Each carrier D is provided with a central partition wall 34 which extends longitudinally thereof and is formed integral with the top and bottom walls 32. As clearly shown in Figure 1, the partition wall 34 has the opposite ends thereof spaced an appreciable distance from the corresponding end walls 33 of the carrier. The side walls of the partition 34 are provided with convex bearing surfaces 35—35 which are directly opposed to the concave bearing surfaces of the members B and are preferably concentric respectively to said concave surfaces, so that the laminated plate springs, when flexed to their full extent, will have true bearing contact with the bearing surfaces throughout their length. The end walls 33 are beveled off at opposite end edges, as clearly shown in Figure 1, so that they will clear the friction wedge faces 24 of the casings A when the mechanism is fully compressed.

The laminated plate springs C are arranged at opposite sides of the mechanism, each plate spring being interposed between the concave bearing surface of one of the members B and the convex opposed bearing surface of the partition wall 34 of the carrier D. Each laminated plate spring comprises two U-shaped spring plate members 36 and 37 and a flat plate spring member 38. As shown clearly in Figure 1, the U-shaped plate spring members are reversely arranged, end for end, so that the portions thereof which connect the legs are disposed respectively at the front and rear ends of the unit. The U-shaped plate spring member 37 has the legs thereof spaced such a distance apart as to accommodate the flat plate spring 38 therebetween and the spaced legs of the U-shaped spring 36 are so arranged that they embrace the U-shaped spring 37. As will be evident by the nested arrangement of springs provided, the

flat spring plate 38 is embraced at opposite sides and at the front and rear ends by the U-shaped springs, thereby enclosing the rough end edges of said plate spring 38 and preventing contact thereof with the spring container. The U-shaped end section of the spring 38 also effectively houses the raw end edges of the spring plate member 37 so as to prevent the edges thereof from damaging the container for the spring unit. The legs of the spring 36 are so proportioned that the U-shaped connecting section of the spring 37 protrudes slightly beyond the end edges of the same when the spring unit is completely assembled, thereby holding the raw end edges of the spring plate 36 spaced from the corresponding end wall 33 of the carrier and protecting the latter from damage. As will be evident, the arrangement of carrier and spring units provided prevents displacement of the spring units both lengthwise and vertically.

The inner ends of the casings of each unit are spaced apart such a distance that they will engage at the same time that one of the follower sections 28 of one of the casings A engages one of the stop shoulders 15 to limit the compression of the mechanism.

The shock absorbing units of my improved mechanism are arranged respectively in the front and rear pockets of the yoke 18 and, as will be evident, are compressed in unison during a compression stroke of the gear, the front follower of the front unit and the front follower of the rear unit being forced inwardly respectively by the front end of the yoke member and the filler block 19 respectively, during inward movement of the coupler. During a draft or pulling action, the rear followers of the front and rear units will be pulled forwardly respectively by the filler block 19 and the rear end connecting section of the yoke 18. The follower casings A are at all times supported by the guide plates 19 and the yoke 18 is in turn supported by the follower members.

The operation of my improved shock absorbing mechanism, assuming a compression stroke, is as follows: The end followers A of each unit will be moved inwardly toward each other longitudinally of the mechanism, thereby wedging the side members B laterally inwardly and compressing the laminated plate spring units against the partition wall 34 of the carrier D, thereby flexing the plate springs. As will be evident, in addition to the spring resistance offered by the members C, and the frictional resistance provided due to the slippage of the spring plates on each other during flexing thereof, additional resistance is offered by the slippage of the friction wedge faces 24 of the followers A on the cooperating friction wedge faces 30 of the members B.

During the entire compression stroke of the mechanism, the members B are directly supported by the ledges 48 of the follower casings A and the plate springs are supported by the carrier D, which in turn is supported by the bottom walls 23 of the two cooperating end follower casings A. In order to prevent damage to the carriers D, the same are made of such a length that the end walls 33 thereof will not engage the yoke ends or spacing block 19 when the mechanism is under full compression.

Release of the mechanism is effected by the tendency of the springs 36 to straighten out, thereby forcing the side members B laterally apart and wedging the end followers A outwardly. Outward movement of the followers A is limited by engagement of the extensions 29 which engage the shoulders 26 on the side walls of the casings A. The parts of each unit are preferably so proportioned that the laminated plate springs are under a slight initial compression.

While I have herein shown and described what I consider the preferred manner of carrying out my invention, the same is merely illustrative and I contemplate all changes and modifications which come within the scope of the claims appended hereto.

I claim:

1. In a shock absorbing mechanism, the combination with followers relatively movable toward and away from each other lengthwise of the mechanism; of two sets of spring plates interposed between the followers and disposed lengthwise of the mechanism; a carrier for said plates, said carrier having spacing means thereon interposed between the sets of plates and having bearing engagement with said plates; and laterally inwardly movable means on opposite sides of said two sets of plates actuated upon relative movement of said followers for flexing said plates by forcing the same against said spacing means.

2. In a shock absorbing mechanism, the combination with followers relatively movable toward and away from each other; of a pair of side members having longitudinally disposed, curved bearing surfaces on the inner sides thereof, said side members and followers having cooperating wedge faces effective to force the side members laterally toward each other upon relative approach of the followers; two laminated plate springs disposed on opposite sides of the mechanism; and a spacing member interposed between said plate springs, said spacing member having curved bearing surfaces on the opposite sides thereof, cooperating with the laminated plate springs.

3. In a shock absorbing unit for railway draft riggings, including end follower castings relatively movable toward and away from each other, said casings having opposed interior wedge friction surfaces; of a pair of side members having wedge friction surfaces at opposite ends thereof, cooperating

with the wedge friction surfaces of the casings respectively, said side members having bearing faces on the inner sides thereof; a carrier supported by said follower casings, said carrier having end walls and a central partition wall, said partition wall being longitudinally disposed and having bearing faces on opposite sides thereof; and a laminated plate spring interposed between each side member and the partition wall of the carrier, said laminated plate springs being held against relative movement lengthwise of the carrier by the end walls of the latter.

4. In a shock absorbing unit for railway draft riggings, including end follower casings relatively movable toward and away from each other, said casings having opposed interior wedge friction surfaces; of a pair of spaced side members disposed lengthwise of the mechanism, said members having wedge friction surfaces at opposite ends thereof, cooperating with the wedge friction surfaces of the casings respectively, said side members having bearings faces on the inner sides thereof; a carrier supported by said follower casings, said carrier having end walls and a central partition wall, said partition wall being longitudinally disposed and having bearing faces on opposite sides thereof; and a laminated plate spring interposed between each side member and the partition wall of the carrier, said laminated plate springs being held against relative movement lengthwise of the carrier by the end walls of the latter, each of said laminated plate springs including a flat plate spring element and a plurality of reversely arranged telescoped U-shaped spring plate members embracing said element.

In witness that I claim the foregoing I have hereunto subscribed my name this 25th day of July, 1928.

JOHN F. O'CONNOR.