Aug. 12, 1947. G. E. DATH 2,425,364

RAILWAY DRAFT SPRING AND FRICTION SHOCK ABSORBING MECHANISM

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Fig. 1

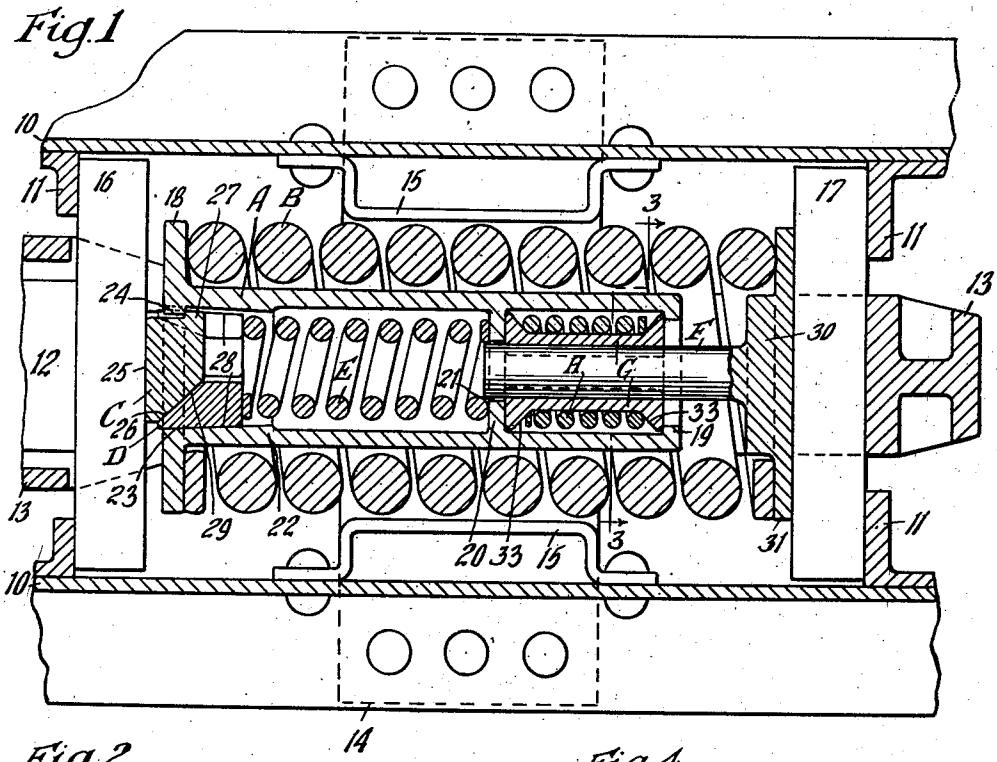



Fig. 2

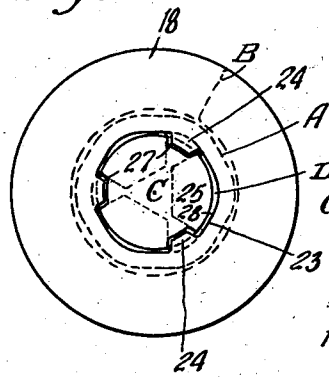



Fig. 4

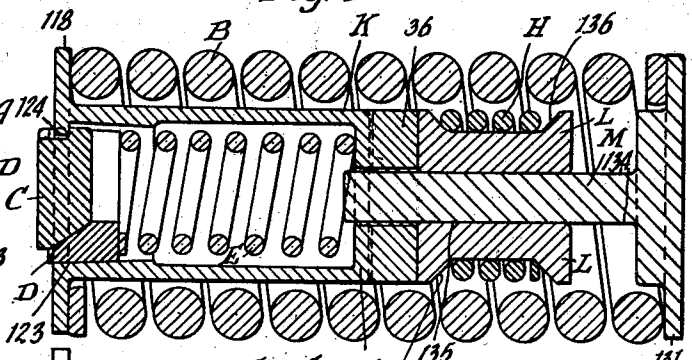



Fig. 3

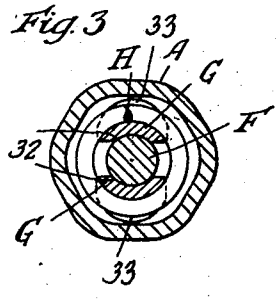
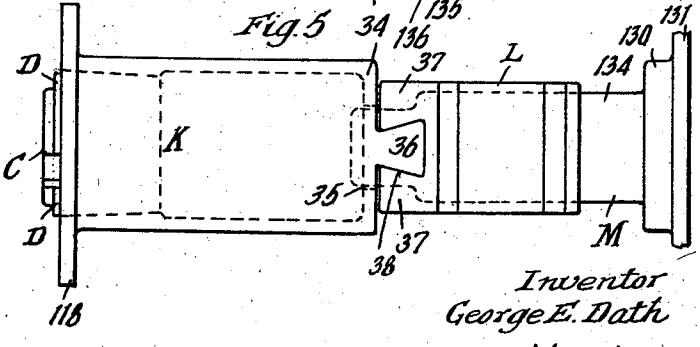



Fig. 5

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## RAILWAY DRAFT SPRING AND FRICTION SHOCK ABSORBING MECHANISM

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4 Claims. (Cl. 213—24)

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This invention relates to improvements in Shock absorbing mechanisms and more particularly to shock absorbing mechanisms employed in connection with railway draft riggings.

One object of the invention is to provide a shock absorbing mechanism especially adapted for railway draft riggings, having combined spring and frictional resistance, wherein the shocks are absorbed by a relatively heavy spring means during the major portion of the compression stroke of the mechanism, followed by combined spring and frictional resistance during the remainder of the compression stroke to absorb the heavier shocks.

A further object of the invention is to provide in a mechanism as set forth in the preceding paragraph, means for snubbing or dampening the action of the spring means to reduce the vibratory action of the same.

A more specific object of the invention is to provide a shock absorbing mechanism of the character indicated, comprising a movable friction casing, movement of which is resisted by a relatively heavy spring to absorb the shocks during the major portion of the compression stroke of the mechanism, and a spring resisted friction clutch slidable within the casing wherein snubbing means is provided to snub the action of the heavy spring, which snubbing means comprises a friction element with respect to which the casing is movable, and spring pressed friction shoes movable with the casing and slidably embracing said friction element, and wherein high frictional resistance is produced during the latter portion of the compression stroke of the mechanism by arresting movement of the friction shell and thereby effecting relative sliding movement of the clutch and shell with respect to each other.

Other 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 front end elevational view of the shock absorbing mechanism illustrated in Figure 1. Figure 3 is a transverse, vertical sectional view, corresponding substantially to the line 3—3 of Figure 1, the outer spring being omitted. Figure 4 is a view, similar to Figure 1, showing the shock absorbing mechanism only, and illustrating another embodiment of the invention. Figure 5 is a top plan view of the mechanism illustrated in Figure 4.

In said drawing, referring first to the embodiment of the invention illustrated in Figures 1, 2, and 3, 10—10 indicate channel-shaped center or draft sills of a railway car underframe having front and rear stop lugs 11—11 on the inner sides thereof. The inner end portion of the drawbar is indicated by 12 and is connected to the yoke 13 which encloses the usual front and rear followers of the railway draft rigging and the shock absorbing mechanism. The yoke is supported by a detachable saddle plate 14 secured to the underneath sides of the sills 10—10. Guide brackets 15—15 of the usual type are provided at opposite sides of the shock absorbing mechanism, the same being secured to the sills 10—10. The front and rear followers of the draft rigging are indicated by 16 and 17, respectively.

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My improved shock absorbing mechanism, as illustrated in Figures 1, 2, and 3, comprises broadly a casing A; an outer main spring resistance B; a wedge block C; three friction shoes D—D—D; a spring resistance E within the casing; a friction post F; a pair of friction elements G—G; and a spring H surrounding the friction elements for pressing the same against the post.

The casing A is in the form of a cylindrical tubular member which is open at its front and rear ends. At the front end, the casing A is provided with a laterally outstanding, annular flange 18, which acts as a spring follower member. At the rear or inner end, the casing A is provided with an inturned stop flange 19 for a purpose hereinafter described. Between the front and rear ends thereof, the casing is provided with an interior, transverse partition wall 20 which divides the casing into front and rear chambers or compartments. The partition wall 20 is provided with a central opening 21 therethrough which accommodates the friction post F for lengthwise movement. At the forward end of the casing, the side walls thereof are thickened, as indicated at 22, said thickened portion of the casing forming the friction shell proper of the mechanism. The thickened portion 22 of the casing is provided with three longitudinally extending, interior friction surfaces 23—23—23 of V-shaped, transverse cross section. The V-shaped friction surfaces 23 converge inwardly of the casing, whereby a tapering friction shell section is provided. At the front end, the casing is provided with three, equally spaced, inwardly extending, retaining lugs 24—24—24, which serve to limit outward movement of the wedge block C.

The wedge C is in the form of a relatively heavy block having a vertical flat front end face 25 adapted to bear on the main front follower 16 of the draft rigging. At the inner end, the block

C is provided with three inwardly converging, flat wedge faces 26—26—26, which are arranged symmetrically about the central longitudinal axis of the mechanism. Between its front and rear ends, the wedge block C has three laterally outwardly projecting retaining lugs 27—27—27, which are engaged in back of the lugs 24—24—24 of the casing to anchor the wedge to said casing.

The friction shoes D are three in number and have V-shaped, outer friction surfaces 28—28—28 engaging, respectively, the V-shaped friction surfaces 23—23—23 of the casing. On the inner side, each shoe is provided with a wedge face 29 which engages the corresponding wedge face 26 of the block C. The wedge faces 29—29—29 of the three shoes D—D—D are correspondingly inclined to and engaged with the three wedge faces 26—26—26, respectively, of the wedge block C.

The spring E, which is in the form of a helical coil, is disposed within the front chamber of the casing and has its front and rear ends bearing respectively on the inner ends of the friction shoes D—D—D and the partition wall 20 of the casing. The spring E is preferably under initial compression in the assembled condition of the mechanism.

The friction post F is in the form of a bar of cylindrical, transverse cross section and has a disclike base portion 30 at its outer end, which is reduced in thickness at its periphery to provide an annular flange 31, which is of lesser thickness than the central portion of the disc. The disc is thus, in effect, provided with a central boss, which projects forwardly and on which the friction post is located. The disclike base portion 30 is of the same diameter as the peripheral flange 18 of the casing A and functions as a rear spring follower member.

The outer main spring B is in the form of a relatively heavy coil which surrounds the casing A and the post F and has its front and rear ends bearing, respectively, on the flange 18 of the casing A and the flange 31 of the base portion of the post F.

The friction elements G are two in number and are contained within the rear chamber of the casing A. These friction elements embrace the post F on opposite sides and are confined against lengthwise movement with respect to the casing by the wall 20 and the flange 19 with which the opposite ends of these elements abut. The elements G fit the cylindrical post F and are provided with transversely curved, longitudinally extending friction surfaces 32—32 on their inner sides which slidably engage the post. On the outer sides, the shoes are provided with wedge faces 33—33 at the front and rear ends thereof, respectively. The wedge faces 33—33 are of conical contour and face inwardly.

The spring H, which is employed in connection with the friction elements G—G, is in the form of a relatively light, helical coil and surrounds the two friction elements, having its front and rear ends in wedging engagement with the wedge faces 33—33 and 33—33 of the two friction elements G—G. The spring H is under a predetermined amount of compression and thus constantly wedges the shoes inwardly against the friction surface of the post F, due to the wedging engagement of the outer end coils of the spring with the wedge faces 33—33.

The operation of my improved shock absorbing mechanism, as illustrated in Figures 1, 2, and 3, is as follows: Upon the front and rear followers 16 and 17 of the draft rigging being moved toward each other, either by inward movement of the coupler against the front follower 16 or by pulling action of the yoke against the follower 17, the shock absorbing mechanism is compressed between the followers 16 and 17, thereby forcing the wedge C inwardly against the friction shoes D—D—D, resisted by the spring E.

The wedging action thus set up presses the shoes against the friction surfaces of the casing with sufficient force to cause the casing to move inwardly in unison with the wedge C against the resistance of the spring B. Thus, during the major portion of the compression stroke of the mechanism, the main resistance is offered by the spring B. While the spring B is being compressed, slight frictional resistance is had between the friction post F and the friction elements G—G, thereby snubbing the action of the spring B. As the mechanism is further compressed, the inner end of the casing A engages the projecting boss of the disclike base portion 30 of the friction post F and further rearward movement of the casing is positively arrested, thereby compelling the friction clutch, comprising the shoes D—D—D and the wedge C to be slid inwardly of the friction shell during the remainder of the compression stroke. High frictional resistance is thus provided during the final compression of the mechanism. When the actuating pressure is reduced, the spring B returns the casing A to the normal full release position shown in Figure 1, and the friction shoes and wedge block C are returned by the expansive action of the spring E, outward movement of the wedge being limited by engagement of the lugs 27 thereof with the lugs 24 of the casing. During this outward movement of the friction shell, the action of the spring B is effectively snubbed by the frictional engagement between the elements G—G and the post F.

Referring next to the embodiment of the invention illustrated in Figures 4 and 5, the design is the same as that illustrated in Figures 1, 2, and 3, with the exception that the friction elements, which cooperate with the post, are anchored to the rear end of the casing instead of being confined within a chamber of the casing, and that the friction post is in the form of a flat plate, instead of a cylindrical bar.

My improved shock absorbing mechanism, as illustrated in Figures 4 and 5, comprises a casing K; two friction shoes L—L; a friction post M with which the shoes cooperate; and the following additional parts which are all identical with the corresponding parts illustrated in Figures 1, 2, and 3: a main spring B; a wedge C; three friction shoes D—D—D; a spring E; and an additional spring H.

The casing K is in the form of a cylindrical, tubular member, closed at its rear end by a transverse, vertical wall 34 having a transverse opening 35 therethrough, adapted to accommodate the platelike friction post M for lengthwise movement. At the rear end, the casing K has an outwardly projecting, relatively heavy lug 36, which is in the form of a dovetail projection. At the front end, the casing K is provided with an annular, outstanding flange 118, similar to the flange 18 hereinbefore described. At the front end of the casing, three interior friction surfaces 123—123—123 are provided, which correspond to the friction surfaces 23—23—23 hereinbefore described, and which are of V-shaped, transverse cross section and cooperate with the corresponding V-shaped friction surfaces of the shoes D—D—D. The casing K is also pro-

vided with three interior lugs 124—124—124 at the front end thereof, which correspond to the lugs 24—24—24 hereinbefore described and serve to anchor the wedge C to the casing.

The post M comprises a flat, platelike section having longitudinally disposed, flat friction surfaces 134—134 on opposite sides thereof. The platelike post M is provided with a disclike base 130 having an annular flange 131, corresponding to the disclike base 30 of the post F hereinbefore described and the flange 31 of said disc.

The friction elements L are in the form of elongated blocks having flat friction surfaces 135—135 on the inner sides thereof engaging the flat friction surfaces 134—134 at opposite sides of the post M. At the front and rear ends, the shoes are provided with wedge faces 136—136 which face inwardly and function in the same manner as the wedge faces 33—33 of the friction elements G hereinbefore described. The spring H, which is similar to the spring H hereinbefore described in connection with Figures 1, 2, and 3, is under a predetermined compression and has wedging engagement with the wedge faces 136—136 and 136—136 of the friction elements L—L to force the latter against the friction post. Each shoe is provided with a forward extension 37 having an opening 38 of dovetail form adapted to receive the corresponding dovetail portion of the lug 36 of the casing K. The friction elements L—L are thus anchored to the casing K by the dovetail connection, and while they are compelled to move in unison with the casing in lengthwise direction, they may move laterally inwardly and outwardly to properly cooperate with the friction post, that is, so that they may be wedged against the post by the action of the spring H.

The operation of the mechanism illustrated in Figures 4 and 5 does not materially differ from the operation of the mechanism hereinbefore described in connection with Figures 1, 2, and 3, and therefore no further detailed description thereof is required.

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

I claim:

1. In a shock absorbing mechanism, the combination with a friction casing having a spring follower flange at its outer end; of a friction post having a spring follower flange at its outer end, said casing and post being movable in lengthwise direction toward and away from each other; a main spring resistance interposed between said follower flanges of the casing and post and yieldingly opposing relative lengthwise movement of the casing and post toward each other; cooperating stop means on said post and casing limiting relative lengthwise movement of the casing and post to less than the full compression stroke of the mechanism; friction shoes within the casing embracing the friction post and having sliding engagement therewith; stop shoulders on the casing engaging said shoes to hold said shoes against movement lengthwise of the casing; means for yieldingly pressing said shoes against the post; and a spring resisted friction clutch slidingly telescoped within the casing and receiving the actuating force.

2. In a shock absorbing mechanism, the combination with a friction casing; of a friction post, said casing and post being movable in lengthwise direction with respect to each other; a main spring resistance yieldingly opposing relative lengthwise movement of the casing and post; stop means on said post engageable with the inner end of the casing to limit relative lengthwise movement of the post and casing to less than the full compression stroke of the mechanism; friction shoes within the casing at the inner end thereof; shoulders on said casing engaging the opposite ends of said shoes to hold said shoes against movement lengthwise with respect to the casing, said shoes embracing said post and having lengthwise sliding engagement therewith; means for yieldingly pressing said shoes against the post; and a spring resisted friction clutch slidingly telescoped within the casing and receiving the actuating force.

3. In a shock absorbing mechanism, the combination with a friction casing; of a friction post, said casing and post being movable in lengthwise direction with respect to each other; a main spring resistance yieldingly opposing relative lengthwise movement of the casing and post; stop means on said post limiting relative lengthwise movement of the post and casing to less than the full compression stroke of the mechanism; dovetail anchoring lugs projecting from the inner end of the casing; friction shoes having dovetail seats receiving said lugs for anchoring the shoes to the casing for movement in unison therewith, said shoes embracing said post and having lengthwise sliding engagement therewith; means for yieldingly pressing said shoes against the post; and a spring resisted friction clutch slidingly telescoped within the casing and receiving the actuating force.

4. In a shock absorbing mechanism, the combination with a friction casing; of a friction post, said casing and post being relatively movable toward and away from each other in lengthwise direction; a follower flange at the outer end of the casing, said casing being open at the outer and inner ends; an inturned stop flange at the inner end of the casing; an interior, transverse partition wall between the ends of the casing; friction elements confined against endwise movement with respect to the casing between said partition wall and inturned stop flange, said elements embracing the post therebetween and having lengthwise sliding engagement therewith; spring means within the casing forcing said elements against the post; an abutment on said post engageable with the inner end of the casing to limit relative lengthwise movement of the casing and post to less than the full compression stroke of the mechanism; friction shoes having lengthwise sliding engagement with the interior walls of the casing at the outer end portion of said casing; a wedge block receiving the actuating force and having wedging engagement with the shoes; and additional spring means within the casing interposed between said partition wall and shoes and yieldingly opposing inward movement of the shoes.

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