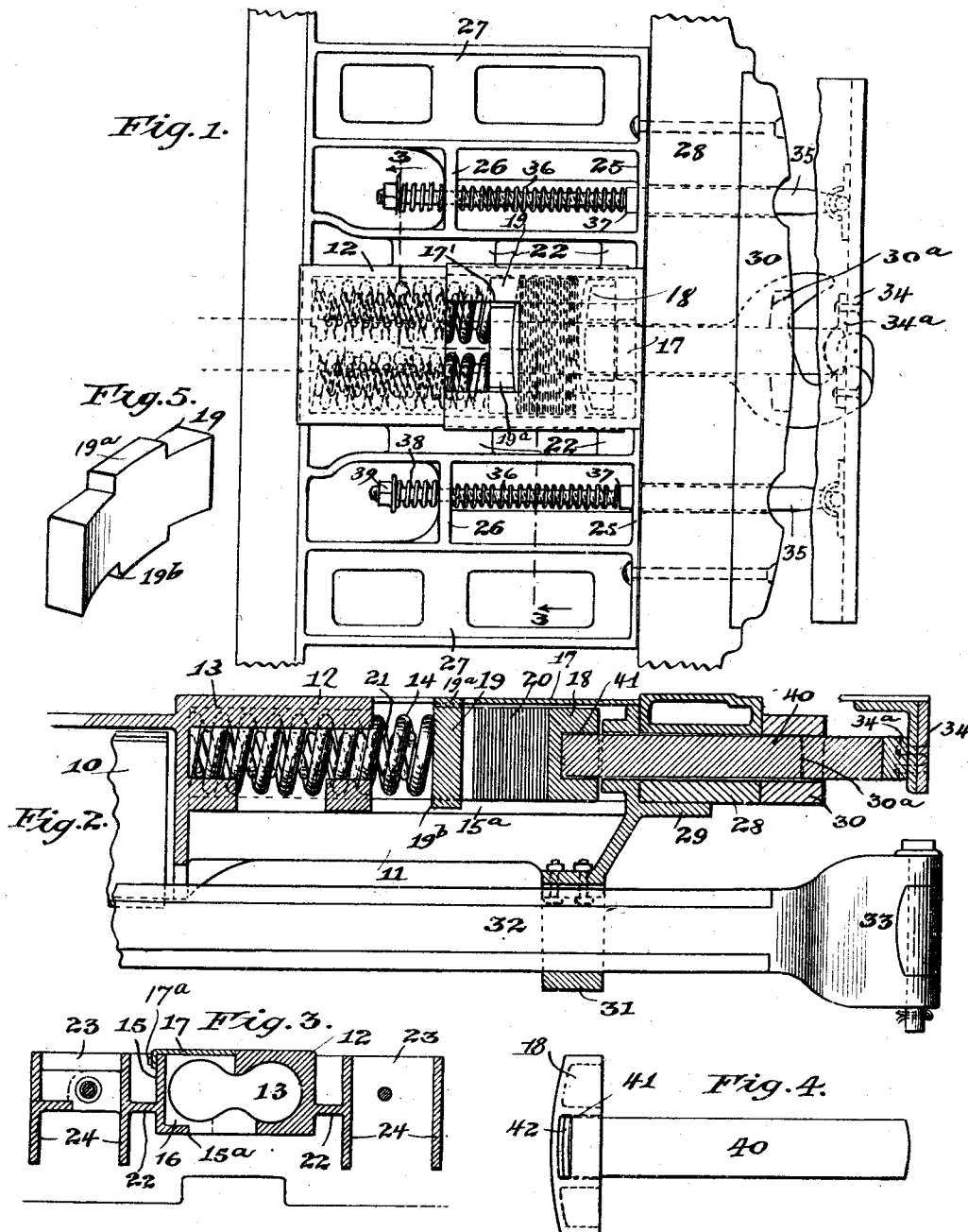


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 STRAIN RESISTING MECHANISM.
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GEORGE H. FORSYTH AND ARTHUR C. DAVIDSON, OF CHICAGO, ILLINOIS, AND FREDERICK S. GALLAGHER, OF COLLINWOOD, OHIO, ASSIGNORS TO FORSYTH BROTHERS COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

STRAIN-RESISTING MECHANISM.

1,065,676.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, GEORGE H. FORSYTH and ARTHUR C. DAVIDSON, both citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, and FREDERICK S. GALLAGHER, a citizen of the United States, residing at Collinwood, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Strain-Resisting Mechanisms, of which the following is a specification.

This invention relates to strain-resisting devices for railway cars and other uses, and has for its principal object to provide an improved mechanism for absorbing buffing and other strains and cushioning the cars and other devices against violent and injurious shocks.

More specifically, the invention aims to produce a buffing device wherein a graduated resistance is effected.

Another object of the invention is to produce a device of the character named in which the extent of compression that can be imparted to the strain-resisting spring or springs is limited, thus preventing injury to said spring or springs from going solid or becoming set.

Still another object of the invention is to provide a simplified and improved housing or support for the element of the buffing mechanism capable of incorporation in the platform casting, thus reducing the space usually required for these parts at the end of the car.

Other minor objects and advantages of the invention will be apparent from the following description, taken in connection with the accompanying drawings which illustrate a preferred embodiment of the invention, and in which,—

Figure 1 is a plan view of the mechanism as applied to the platform casting of a railway car; Fig. 2 is a vertical longitudinal section, substantially on the median line of Fig. 1; Fig. 3 is a cross-section through the platform casting on the offset line 3—3 of Fig. 1, viewed in the direction of the arrows the springs being omitted; Fig. 4 is a detail plan view of the central buffer stem and its cooperating follower, illustrating as a modification an adjusting device that may be employed; and Fig. 5 is a perspective

view of the inner or rear follower of the buffing mechanism.

Referring to the drawings, 10 (Fig. 2) may designate the forward end portion of one of the usual center sills of the under-frame of a railway car, and 11 designates as an entirety a skeleton platform casting projecting in advance of said center sills. Inasmuch as this platform casting has been specially designed by us for the housing and support of the main elements of the buffing mechanism proper and in part constitutes the subject-matter of our present invention, we have shown and will describe the same somewhat in detail. This housing comprises essentially a central or intermediate portion of generally box-like form, the inner or rear part of which, designated by 12, is solid except for the provision of a pair of parallel bores 13 which may be round or of other shape and (Fig. 3) of sufficient length and diameter to fit and house the major portion of the two main buffing springs 14, while the outer or forward portion 15 (Fig. 3) contains a rectangular chamber 16 open at the top and provided with a removable cap or cover 17 held in position by the bolts 17^a. In the chamber 16 are housed a pair of front and rear follower plates or blocks 18 and 19, respectively, the former of which has a convex rear face and the latter a concave front-face, as shown in Fig. 1. Between the opposed convex and concave faces of these followers is interposed a series of flat elastic metal plates, designated by 20. Within the main buffing springs 14 we also preferably employ a pair of smaller auxiliary springs 21, which latter are slightly shorter than the main springs 14, so as to be called into action later during the buffing thrust. On either side of the intermediate box-like portion of the casting and connected thereto by horizontal webs 22 (Figs. 1 and 3) are a pair of skeleton housings 23 designed to accommodate the side stems of the buffer plate, and comprise essentially parallel longitudinal ribs 24 preferably of the full depth or thickness of the platform casting and transverse ribs 25 and 26, both of which are apertured for the passage of the side stems, the front transverse ribs 25 constituting the portions of the front transverse wall of the casting. Beyond and outside of the

side housings 23, the skeleton structure of the platform casting may be extended, if desired, to the desired width, as represented by the parts 27 in Fig. 1.

28 designates the front transverse sill of the platform that lies against the front transverse wall of the casting and may rest upon the forwardly projecting ledge 29 (Fig. 2) of said casting. To the forward face of the sill 28 is secured the stationary transverse buffer-block 30. Preferably, and as herein shown, the platform casting is provided also with a suitable depending hanger 31 adapted to support the underlying shank 32 of the coupler 33; but this latter feature may be omitted where other means for supporting the coupler shank or drawbar are provided; and is not essential to our invention.

34 designates the movable buffer-plate, the same being supported on the forwardly projecting ends of the side stems 35 that are pivoted thereto. These side stems extend through registering apertures in the buffer-block 30, sill 28, and transverse ribs 25 and 26, being supported and guided therein, and within the housings 23 have reduced portions surrounded by springs 36. These springs bear at one end against shoulders 37 on the side stems and at their other ends against the rear transverse ribs 26. The rear ends of said side stems extend somewhat beyond the ribs 26 and are encircled by springs 38 confined between the ribs 26 and nuts 39 on the ends of the stems. Springs 38 are preferably somewhat stronger than springs 36; and their purpose is to allow such an angular swing of the buffer-plate 34 as shall enable the two cooperating buffer-plates on adjacent cars of a train to remain in contact throughout while the train is passing over a curve. 40 designates the central buffer stem, which is somewhat heavier than the side stems and is supported and guided in apertures formed through the stationary buffer block 30, sill 28, and front wall of the platform casting, the inner end of said stem entering a recess 41 in the outer or front face of the forward follower 18. The outer end of said stem 40 normally contacts with the inner side of the movable buffer-plate 34 or a striking-plate 34^a thereon, as hereinafter described.

It will be observed by reference to Fig. 2 that the springs 14, as likewise their contained springs 21, project some distance forwardly of the forward end of the rear portion 12 of the central housing, so that in the normal condition of the parts there is a space provided between the forward face of the rear housing portion 12 and the rear side of the rear follower 19 for the inward travel of the latter under buffing strains, which space is less than the distance between the forward face of the stationary

buffer-block 30 at its central point, and the inner side of the movable buffer-plate 34. From this it will be seen that when the movable buffer-plate is thrust inwardly, the rear follower 19 will move inwardly, compressing first the springs 14, subsequently compressing and meeting the added resistance of the inner springs 21 until the follower strikes the forward face of the rear housing portion 12, after which the elastic and frictional resistance of the stronger plate springs 20 will be called into marked action to dampen the recoil and withstand the further inward thrust of the buffer-plate. By means of the nuts on the inner ends of the side-stems not only can the springs 36 be tensioned as desired, but the distance of the movable buffer-plate 34 from the stationary buffer-block 30 can be nicely adjusted according to the extent of inward movement permitted by the yielding of the elastic resistance elements. To provide adjustment arising from possible variations in the parts, as well as to act as wear strips, one or more strips 42 (Fig. 4) may be interposed between the bottom of the recess 41 of the front follower and the adjacent end of the central stem 40. By this device wear on the inner end of the stem 40 and the consequent shortening of the extent of yielding movement of the resistance elements can be compensated for. We also prefer to employ between the outer end of the central stem 40 and the inner face of the movable buffer-plate 34 a striking-plate 34^a that is preferably secured to said buffer-plate and has a convexed inner face, as shown, adapted to cooperate with the concaved outer end of the stem. To provide clearance for said striking plate, the adjacent face of the stationary buffer-block 30 may be suitably recessed or mortised, as shown at 30^a in Fig. 2.

When the parts are assembled, the buffer-plate 34 or the striking-plate 34^a preferably normally bears under pressure against the forward end of the central buffer stem 40, which prevents objectionable striking of said parts together under buffing thrusts. To effect this relation of the parts, the buffer-plate may be drawn inwardly against the end of the central buffer stem 40 by simply tightening up the nuts 39, if desired; or, the desired adjustment may be effected by inserting or withdrawing one or more of the strips 42. The several buffer stems are all loosely fitted in their bearings with sufficient clearance to permit a limited degree of angular movement of the buffer-plate 34, so as to preserve contact between two adjacent buffer-plates in passing over curves.

In order to afford as large an extent of contacting surface as possible to the forward end of the spring housing 12 and the rear face of the rear follower 19, we preferably cut away the cover 17 as shown at 17^a

and provide on the upper edge of the follower 19 a projection 19^a substantially co-extensive laterally with and movable through the cut out portion of the cover. A similar depending projection 19^b (Fig. 2) is also preferably employed on said follower for the same purpose, said projection lying between the ledges 15^a (Fig. 3) on which the ends of the followers and plate-springs 20 rest.

While we have shown and described the housing of the resistance elements as embodied in and cast integral with the platform casting, yet, so far as the novel features of said housing are concerned it is apparent that it need not necessarily form a part of the platform casting. The operation of the mechanism has to a considerable extent been already set forth in the description of the mechanism itself, but may be briefly reviewed as follows. Under an inward thrust upon the movable buffer-plate 24 the springs 36 surrounding the side stems offer a limited degree of elastic resistance to the end portions of the buffer-plate, but the main resistance is afforded by the twin coil springs 14, the followers 18 and 19 and plate-springs 20. As soon as the rear face of the follower 19 contacts the projecting ends of the inner auxiliary springs 21, the resistance of these latter is also added to the increasing resistance of the springs 14, and both sets of springs cooperate in opposing the inward travel of the follower 19 until the latter contacts the forward face of the rear housing portion 12. This occurs before either set of springs is exhausted or goes solid, and consequently prevents the injurious results that flow from the setting of said springs. Further inward movement of the buffer-plate is then resisted by the elasticity and friction of the group of plate-springs 20 which unitedly offer a much greater spring resistance than do the coil springs, but which are capable of bending or bowing slightly between the opposed convex and concave faces of the followers 18 and 19, so that the final portion of the inward movement of the buffer-plate is opposed by the combined resistance of the springs 14, 21 and 20, and at the point of farthest inward movement permitted by the spring resistance elements, the movable buffer-plate 34 is brought into substantial contact with the stationary buffer-block 30. Upon the release of the buffering strain, the several springs of course re-act to throw the buffer-plate 34 forwardly and maintain the same in contact with the buffer-plate on the next adjacent car. The relation of the buffer-plate 34 to the coupler 33 is preferably such that when adjacent couplers are engaged, the superposed adjacent buffer-plates engage each other under some pressure which prevents their separation and main-

tains a substantially continuous surface between adjacent platforms. It will be apparent from this description that the heavier shock-absorbing or resistance parts do not become substantially operative until the coupling is effected and the buffers reach a position at or back of the coupling line.

While we have shown but a single group of plate-springs between and cooperating with a pair of followers, it is evident that the principle might be extended to include a plurality of such groups with interposed followers, the plate-springs being of the same or of varying number and capacity. It will also be apparent that, as regards the coil springs 14 and 21, either set may be made the longer or the stronger, according to individual preference or special conditions.

It will be observed that the side walls of the central housing extend from end to end of the skeleton platform casting and thereby constitute in effect reinforcing ribs for said platform casting and for the end of the car.

It will be evident to those skilled in the art that the specific details of the structure shown and described might be considerably varied within the principle of the invention and without sacrificing the benefits and advantages secured thereby, and hence we do not limit the invention to the specific structure shown, except to the extent clearly indicated in specific claims.

We claim:

1. In a buffer for railway cars, a skeleton platform embodying as an integral portion thereof a housing for the resistance elements, the forward portion whereof is of box-like form and the rear portion whereof has a plurality of longitudinal cores, in combination with a plurality of coiled resistance springs in said cores and projecting forwardly thereof, and a pair of transverse followers and interposed plate-springs in said forward portion, a buffer-plate, and a thrust member between the latter and the forward one of said followers, substantially as described.

2. In a buffer for railway cars, a skeleton platform embodying as an integral portion thereof a housing for the resistance elements, the forward portion whereof is of boxlike form and the rear portion whereof is longitudinally cored, in combination with a resistance member in said cored rear portion projecting forwardly thereof, and a pair of transverse followers and interposed plate springs in said forward portion, a buffer-plate, and a thrust member between the latter and the forward one of said followers, substantially as described.

3. In a buffer mechanism for railway cars, a skeleton platform embodying as an integral portion thereof a housing for the re-

sistance elements, the front portion of said housing being of box-like form and the rear portion thereof being longitudinally cored, a resistance member in said cored portion and projecting forwardly thereof, a pair of transverse followers in said front portion, a spring between said followers, a buffer plate, and a thrust member between said buffer plate and the front follower, substantially as described.

4. In a buffing device, the combination of a buffer, a housing, two sets of buffer springs within said housing, the front set comprising transversely-disposed bodily-movable spring plates of greater stiffness than the springs of the rear set, a transverse follower between said front and rear sets of springs, a fixed stop to limit the rearward movement of said follower, and a thrust transmitting means between the buffer and the front set of springs, whereby during buffing action the front set of springs moves bodily until the follower engages the stop, thereby compressing the rear set of springs without substantial flexing of the plate springs and upon further pressure the plate springs may be substantially flexed, substantially as described.

5. In a buffing mechanism for railway cars, the combination of a buffer having a buffer-stem, a housing, a pair of transverse followers within said housing, a rear spring member engaging the rear follower, bodily-movable transverse spring plates between said followers, a stop for limiting the rearward travel of the rear follower and spring plates, the buffer stem engaging the front follower, whereby during the initial buffing action said spring plates are bodily moved toward said rear spring member and the latter is compressed, until said rear follower engages said stop, and during the ultimate buffing action said spring plates are flexed in the line of thrust, substantially as described.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."