Dec. 23, 1941. F. H. EINWAECHTER, JR., ET AL. 2,267,495

BUFFER MECHANISM

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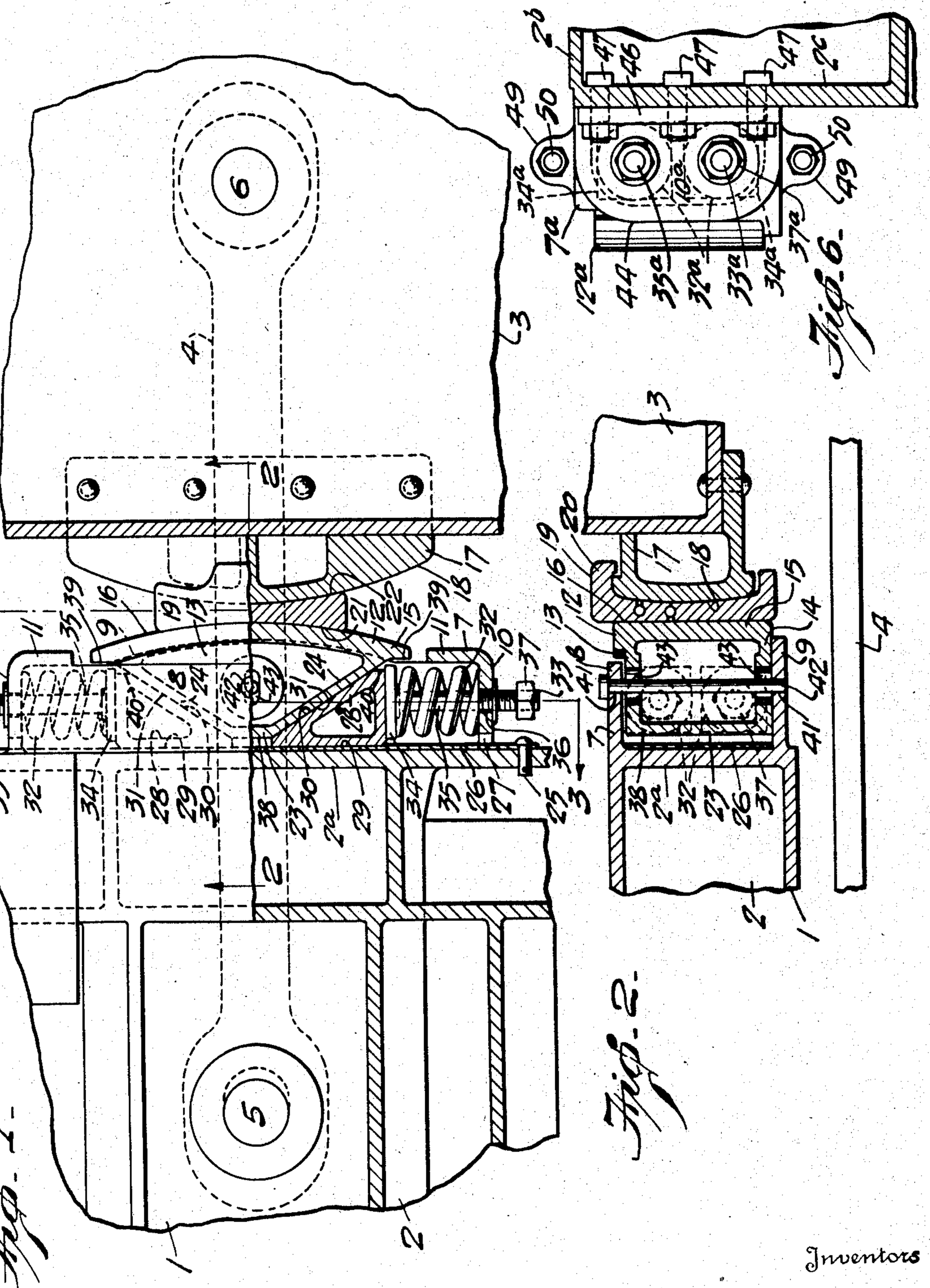

Fig. 2.

Fig. 6.

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Fig. 4.

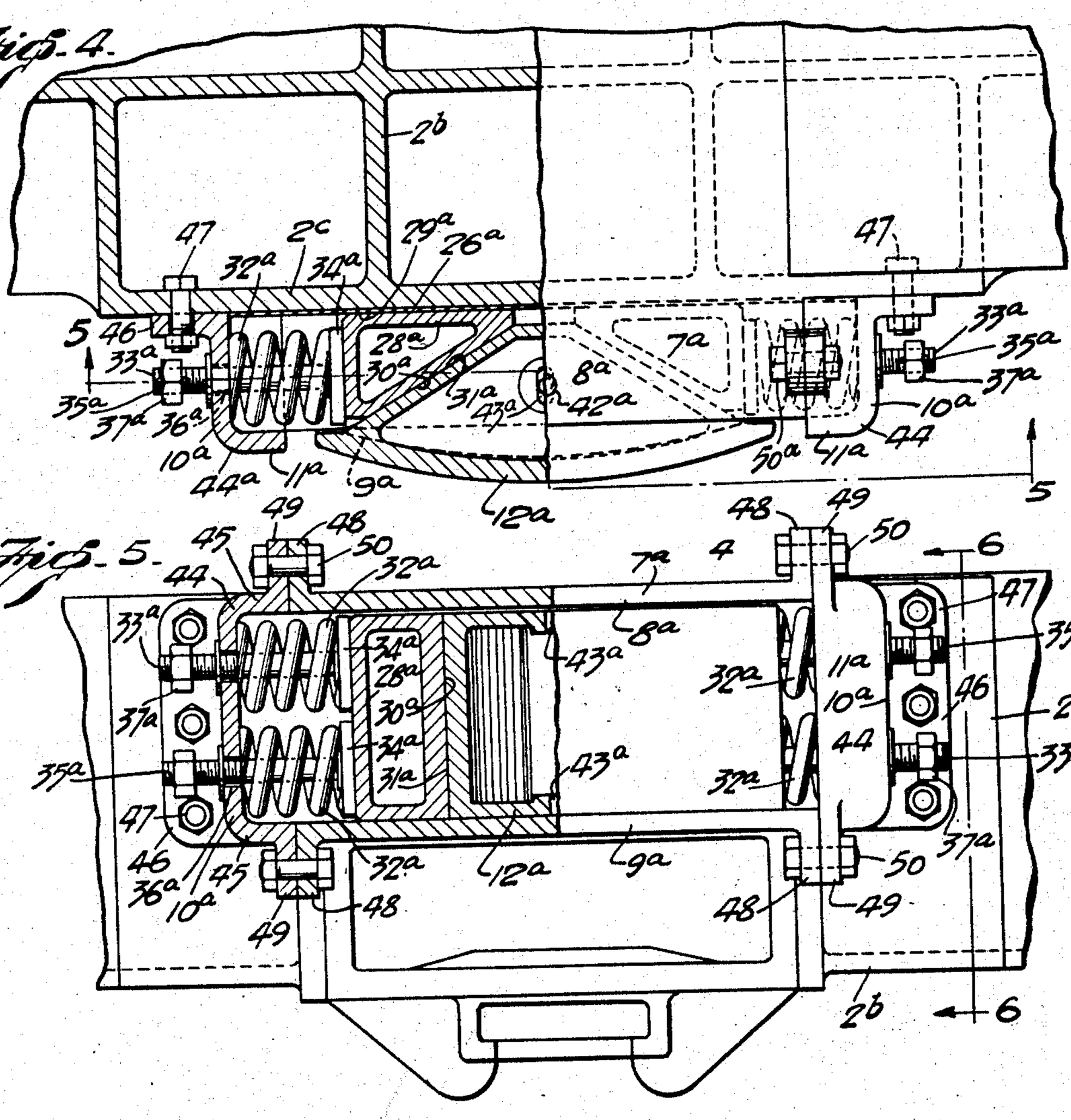
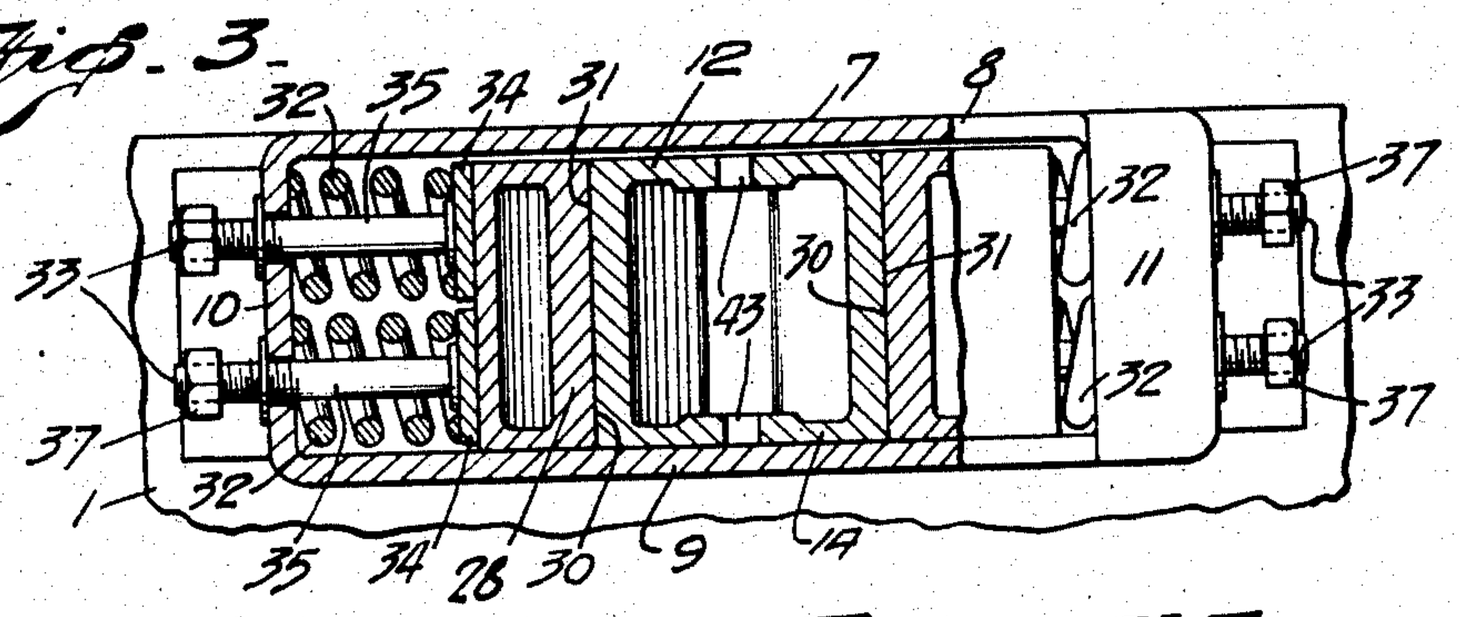


Fig. 5.

Fig. 3.



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BUFFER MECHANISM

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3 Claims. (Cl. 213—221)

The invention relates to a buffer mechanism and particularly to a type thereof which is adapted to be used between a coupled or connected railway engine frame and tender frame.

An object of the invention is to provide a buffer mechanism for absorbing buffing shocks between an engine frame and tender frame.

Another object of the invention is to provide a buffer mechanism capable of creating frictional forces for cushioning or dampening buffing forces between a railway engine and tender.

A further object of the invention is to provide a buffer mechanism having parts thereof removable for any purpose desired without the necessity of disconnecting an engine from its connected tender.

An additional object of the invention is to provide a buffer mechanism arranged and constructed so that the buffing strains or forces transmitted to a tender therethrough will be distributed over an appreciable area.

The above and numerous other objects of the invention will become apparent by referring to the accompanying drawings which disclose exemplified forms of the invention and wherein:

Figure 1 is a partial plan and partial horizontal sectional view of a buffer mechanism embodying the present invention.

Figure 2 is a vertical sectional view taken along the lines 2—2 of Figure 1, looking in the direction of the arrows.

Figure 3 is a partial end elevational and partial vertical sectional view taken along the lines 3—3 of Figure 1, looking in the direction of the arrows.

Figure 4 is a partial plan and partial horizontal sectional view of a modified form of the buffer mechanism illustrated in Figures 1 to 3, inclusive.

Figure 5 is a partial end elevational and partial vertical sectional view taken along the lines 5—5 of Figure 4, looking in the direction of the arrows.

Figure 6 is an end elevational view taken along the lines 6—6 of Figure 5, looking in the direction of the arrows.

Referring now in detail to the drawings and particularly to Figures 1 to 3 thereof, wherein like reference characters designate like parts, the numeral 1 is employed to indicate, in a general manner, the pertinent part of a railway vehicle. Forming parts of the railway vehicle are a tender frame 2 and an engine frame 3 which are interconnected by means of a drawbar 4 through the medium of a tender pin 5 and engine pin 6. As will be understood, the drawbar is adapted to pivot about the pins 5 and 6 as the railway vehicle traverses a curve as well as upon relative lateral movement between the engine and tender.

The tender frame has an end sill 2ª thereof extending transversely of the railway vehicle and with which a buffer housing or casing 7 is integrally formed at the central portion thereof. The buffer housing projects toward the frame and comprises an upper wall 8 outstanding from the end sill adjacent its upper extremity and lower or supporting wall 9 spaced vertically from the upper wall and outstanding from adjacent the lower extremity of the end sill. Spaced a predetermined distance on each side of the longitudinal center line of the vehicle are end walls 10 which join the upper and lower walls to define the lateral limits of the housing. The end walls merge into laterally spaced front walls 11 which are directed toward one another and, together with the joined upper and lower walls, define the clear opening into the housing. Associated with and movable relatively to the housing is a tender chafing block or plate 12 formed, in part, by vertically spaced top and bottom plates 13 and 14, respectively. The vertical distance over the top and bottom plates is slightly less than the corresponding distance between the upper and lower housing walls, and accordingly the chafing block is capable of moving inwardly and outwardly of the housing longitudinally of the vehicle. Joined integrally with the forward extremities of the top and bottom plates is an arcuate, convex, forward or bearing plate 15 having an outer surface 16 thereof cylindrical in formation and struck on an arc about the tender pin 5 for the purpose to be hereinafter explained.

Secured to the engine frame, at substantially the same elevation as the buffer mechanism, is an engine chafing plate 17 outstanding toward the tender from the engine frame and provided with an outer bearing surface 18 of convex, cylindrical configuration. The surface 18 is desirably struck on an arc about the engine pin 6. Interposed between the chafing plates 12 and 17 is a floating chafing plate 19 having an angular top lug 20 which interlocks with the chafing plate 17 and forms a support for the floating chafing plate. The floating chafing plate is provided with cylindrical, concave surfaces 21 and 22 which, respectively, engage and bear against the convex surfaces 16 and 18, and since the floating chafing plate is freely movable transversely of the vehicle within certain predetermined limits, buffing forces will, at all times, irrespective of the angular relationship between or disposition

of the engine and tender, be transmitted between the engine and tender on a direct line joining the pins 5 and 6 through which draft forces are also applied.

The chafing plate for the tender buffer has a vertical inner plate 23 laterally disposed and spaced a predetermined distance forwardly of the tender end sill 2a. The inner plate, which joins the top and bottom plates, merges with angularly disposed, sloping or inclined plates 24, the latter of which terminate in the bearing plate short of or adjacent to the transverse edges thereof. Secured to the end sill by any desired means or method, such as the illustrated rivets 25, is a wear member or liner 26 which extends transversely through the housing to be positioned therein and in bearing relation with the tender end sill. Apertures 27 are formed in the housing end walls to permit the insertion or removal of the liner into or from the housing.

Positioned entirely within the confines of the housing and, like the chafing block 12, supported by means of the lower wall 9 are a plurality of, preferably two, wedges 28 substantially freely movable transversely of the vehicle and interposed between the chafing plate 12 and tender end sill. Each wedge desirably has an inner surface 29 in intimate contact with the liner and an inclined or sloping surface 30 angularly disposed to the inner surface 29 and in bearing relation with a correspondingly disposed outer surface 31 on the associated inclined plate 24. Any compressive action of the buffer mechanism or movement of the chafing plate 12 inwardly of the housing will result in a spreading action of the wedges and the creation of frictional forces on the contacting surfaces of the chafing plate, wedges and liner to thereby cushion or dampen compressive forces transmitted to the mechanism.

In order to control the transverse movement of the wedges there is provided resilient means characterized by coil or helical springs 32, each of which is arranged to react transversely of the vehicle against the housing end walls and associated wedges so that the latter may be urged toward one another into wedging engagement with the chafing plate. Means has been provided to limit or restrict the expansive movement of the springs, and for the accomplishment of this purpose bolts 33 are provided with heads 34 forming spring plates which are interposed between the related spring extremities and the wedges. Extending transversely of the vehicle and outwardly of the housing is a stem 35 formed integrally with and projecting axially of the bolt head through a related spring and a suitably formed aperture 36 in the housing end wall. Rotatably associated with an extremity of each bolt stem outwardly of the housing is a nut 37 which may be manipulated to govern the effective length of the bolt. The heads 34 are made preferably square so as to render them capable of engaging the liner 26 to prevent rotation of the bolts upon a manipulation of the nuts 37. Each nut may be rotated from its illustrated position to bear against the housing end wall to thereby compress the associated spring 32 and facilitate a coupling of the engine and tender without otherwise overcoming the forces created by the buffer mechanism. After this coupling process has been accomplished the nuts may again be rotated until they assume their disclosed position in order that the buffer mechanism may function as intended.

It will be noted that when the engine and tender are angularly related the floating chafing plate, by reason of its being cupped between the chafing plates 12 and 17, will shift from its illustrated position toward an extremity of the chafing plates, depending, of course, upon the disposition of the engine and tender. When buffing forces are transmitted from one frame to another and when they are angularly related the forces may, if provisions are not otherwise made, cause the chafing plate 12 to be forced laterally from its illustrated position, and upon a complete compressive movement of the buffer mechanism the buffing forces may be concentrated in a restricted area of the tender frame. In order to overcome such conditions the inner plate 23 is provided with an inner or plane surface 38 spaced a predetermined distance from the liner and the lateral extremities of the bearing plate have formed thereon transversely spaced, outer or plane surfaces 39 which are longitudinally spaced from correspondingly formed, substantially parallel surfaces 40 on the wedges. Accordingly, upon a full compressive movement of the buffer mechanism the surface 38 will engage the liner simultaneously with an engagement between the confronting plane surfaces 39 and 40 to thereby distribute the buffing forces over an appreciable area of the end wall 2a or that part thereof equal in amount to the transverse distance over the wedges. The arrangement permits the buffer mechanism to function as a solid mass after a complete compressive movement thereof to arrest further approaching movement of the tender and engine frames.

Apertures 41 are formed in alignment in the housing walls 8 and 9 for the accommodation of a retaining bolt 42 extending vertically through the plane of the chafing plate 12 and particularly through slots 43 formed in the top and bottom plates 13 and 14; sufficient clearance being provided about the retaining bolt relative to the top and bottom plates 13 and 14 to permit a free service movement of the chafing plate 12.

Referring now in detail to the species of the invention illustrated in Figures 4 through 6 of the drawings, a tender frame 2b has, adjacent an end thereof, an end sill 2c extending vertically and transversely of a railway vehicle. A buffer housing or casing 7a is associated with the end sill intermediate the extremities thereof and comprises an intermediate portion formed integrally with the end sill and having an upper end wall 8a and a lower wall 9a vertically spaced with respect to one another and extending horizontally away from the end sill. Defining the horizontal or transverse limits of the housing are caps or end closure members 44 each having a vertical end wall 10a which terminates in upper and lower walls 45 in horizontal alignment with the upper and lower walls 8a and 9a, respectively. Each end wall has, extending from a forward extremity, a front wall 11a directed toward the center of the housing to form an outer confining wall. Flanges 46 are formed on the caps and directed outwardly of the housing to lie against the end sill 7c. The flanges are suitably apertured so as to accommodate fastening means of any desired character and represented in the drawings by bolts 47 which removably secure the caps to the end sill. The transverse limits of the upper and lower intermediate walls 8a and 9a are provided with apertured lugs or ears 48 directed vertically. In a similar manner apertured flanges 49 are formed on the cap upper and lower walls to be positioned in bearing relation with associated or related ears.

Bolts 50 or any other desired means are employed to removably tie related flanges and ears together.

Flexibly connected to the housing through the medium of a bolt 42ª, which is preferably fixed with respect to the intermediate housing walls, is a chafing block or plate 12ª substantially identical with the previously described chafing block 12. Positioned entirely within the confines of and desirably of the same extent as the housing is a liner 26ª in intimate contact with the end sill 2ᶜ and adapted to form a removable wear member or means which may be readily replaced. The liner prevents wear of the end sill 2ᶜ during service of the buffer mechanism, and accordingly the tender frame is not weakened by continued use. Like the liner 26, the liners 26ª are also employed for the purpose of taking up slack in the buffer mechanism as the parts thereof wear from continued use, and in this respect it will be noted that a plurality of liners may be interposed between the wedges and end sill of each illustrated buffer mechanism.

Interposed between the chafing block and liner is a pair of counterpart wedges 28ª each of which has a plane surface 29ª, disposed the same as and bearing against the liner, and an inclined or sloping surface 30ª in intimate contact with a similarly disposed surface 31ª on the chafing block. A rearward or inward movement of the chafing block will result in a spreading action being imparted to the wedges, and by reason of the particularly disposed and related surfaces frictional forces will be created on the contacting wedges, liner and chafing block surfaces to assist in cushioning any compressive forces applied to the buffer mechanism.

Maintaining the wedges in engagement with the chafing block are spaced, transversely acting, resilient means, represented by coil or helical springs 32ª. To limit the expansive movement or range of the springs there are provided, like in the previously described structure, bolts 33ª each having a substantially square head 34ª interposed between a spring and a related wedge. Projecting from each bolt head is a stem 35ª which extends axially of the spring through suitable apertures 36ª formed in the cap end walls. Rotatably associated with the portion of each stem outwardly of the housing is a nut 37ª which may be manipulated to govern the effective length of the bolt.

From the above it will be noted that in the instant structure it is not necessary to either disconnect a tender from an engine or the chafing block from the housing to inspect, replace or repair the wedges, liner or springs. This may be easily accomplished by disconnecting one of the caps from the end sill and intermediate portion of the housing, at which time the springs and bolts may be removed with the caps as units to expose the interior of the housing. Access may then be had to any portion or element forming the buffer mechanism for any purpose desired.

From the foregoing it will also be noted that various changes and alterations may be made to the illustrated and described forms of the invention without departing from within the spirit and scope of the appended claims.

We claim:

1. In a radial buffer mechanism for use with a frame of a railway vehicle, the combination of a housing connected to said frame and opening outwardly therefrom, a longitudinally movable chafing block flexibly connected to and extending into said housing, inclined surfaces on said chafing block terminating in substantially parallel intermediate inner and transversely spaced outer plane surfaces, transversely movable wedges interposed between said housing and chafing block having inclined surfaces in intimate contact with said chafing block inclined surfaces and transversely spaced outer surfaces spaced from and parallel with said chafing block outer plane surfaces so that upon a complete compressive movement of said buffer mechanism said chafing block inner plane surface will react against said housing simultaneously with a contact between said chafing block outer plane surfaces and said wedge outer surfaces, and spring means reacting against said wedges and housing for urging the former toward one another.

2. In a radial buffer mechanism for use with a frame of a railway vehicle, the combination of a housing connected to said frame and opening outwardly therefrom, a longitudinally movable chafing block connected to and extending into said housing, an inner plane surface on said chafing block normally spaced from said housing, inclined surfaces on said chafing block diverging from said inner plane surface and terminating in transversely spaced outer plane surfaces substantially parallel with said inner plane surface, transversely spaced wedges interposed between said chafing block and housing, said wedges having inclined surfaces in bearing relation with said chafing block inclined surfaces and plane surfaces normally spaced from said chafing block outer surfaces so that upon a complete compressive movement of said buffer mechanism said chafing block inner plane surface will react against said housing simultaneously with an engagement of said wedge plane surfaces and said chafing block outer plane surfaces to present a substantial equal distribution of buffing forces, transversely acting spring means reacting against said housing and wedges, and means associated with said spring means and housing for controlling the expansive movement of said spring means.

3. In a buffer mechanism for use with a railway vehicle frame, the combination of a housing connected to said frame and opening outwardly therefrom, a longitudinally movable chafing block connected to and extending into said housing, inclined surfaces on said chafing block diverging outwardly of said housing and terminating in transversely spaced outer surfaces, an inner surface spaced from and interposed between said outer surfaces, transversely spaced wedges interposed between said chafing block and housing, said wedges having inclined surfaces in bearing relation with said chafing block inclined surfaces and plane surfaces normally spaced from said chafing block outer surfaces, said chafing block inner surface being spaced from said housing by an amount substantially equal to the distance between said chafing block outer surfaces and said wedge plane surfaces so that upon a complete compressive movement of said buffer mechanism said chafing block outer surfaces will engage said wedge plane surfaces simultaneously with an engagement between said chafing block inner surface and said housing, transversely acting spring means reacting against said housing and wedges, and adjustable means associated with said spring means and housing for limiting the expansive movement of said spring means.

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