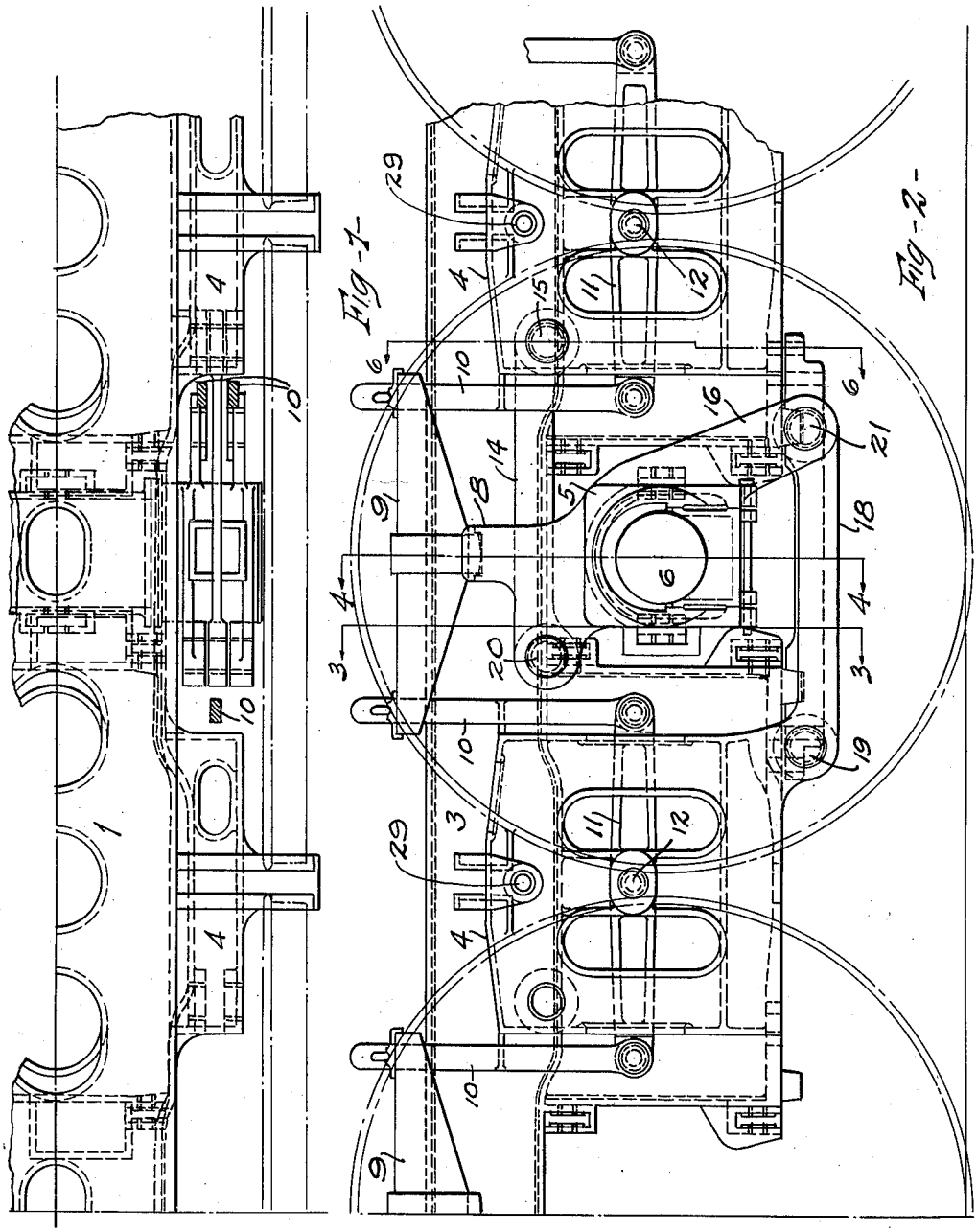
Aug. 21, 1934. E. G. HALLQUIST 1,971,004

RAILWAY JOURNAL BOX AND ASSOCIATED STRUCTURE

Filed June 13, 1932 4 Sheets-Sheet 1



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RAILWAY JOURNAL BOX AND ASSOCIATED STRUCTURE

Filed June 13, 1932 4 Sheets-Sheet 2

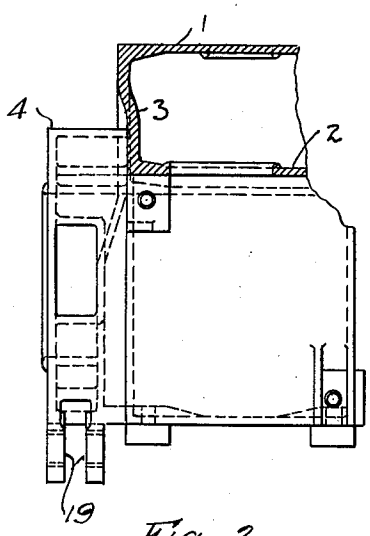


Fig-3-

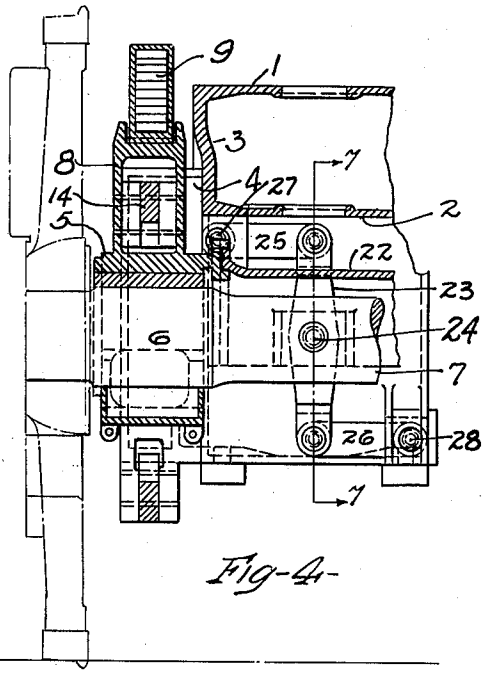


Fig-4-

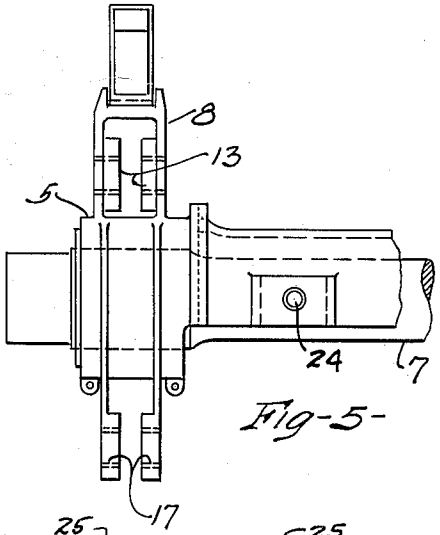


Fig-5-

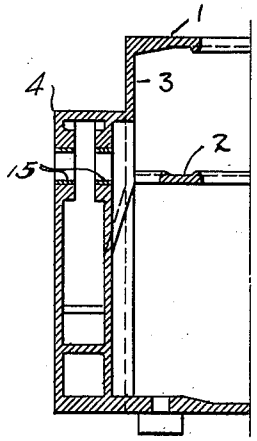


Fig-6-

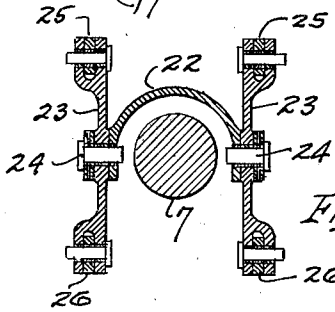


Fig-7-

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RAILWAY JOURNAL BOX AND ASSOCIATED STRUCTURE

Filed June 13, 1932 4 Sheets-Sheet 3

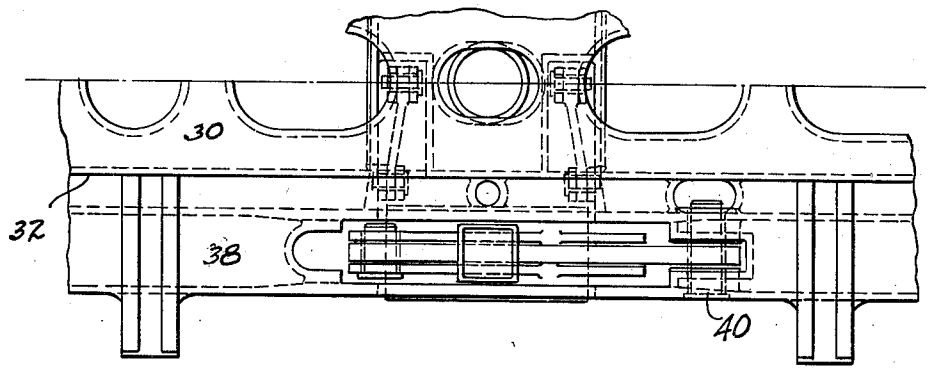


Fig-8-

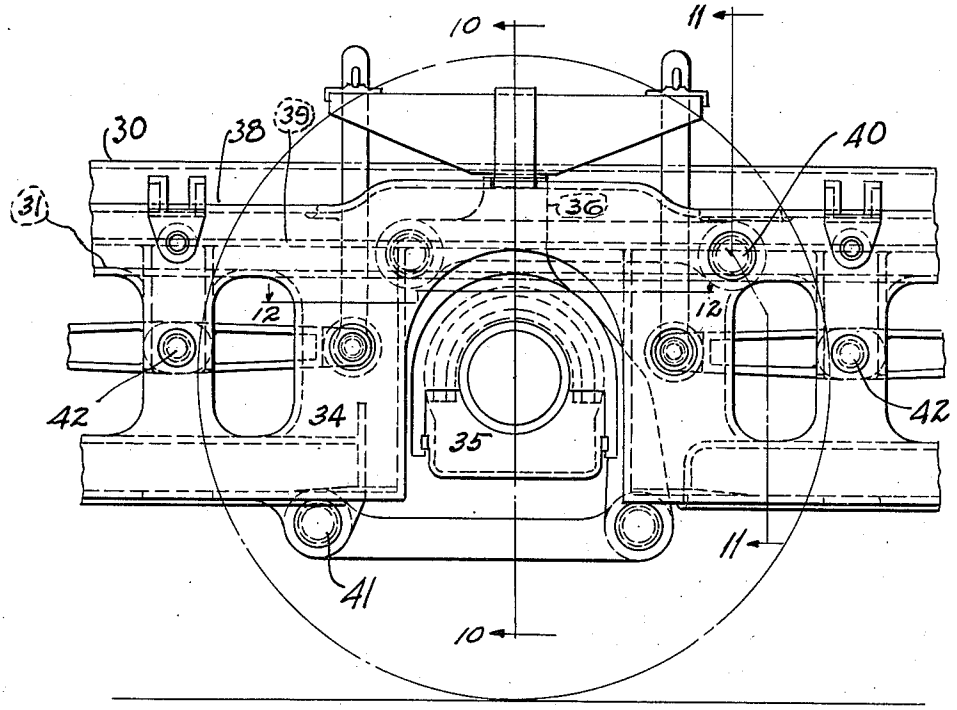


Fig-9-

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RAILWAY JOURNAL BOX AND ASSOCIATED STRUCTURE

Filed June 13, 1932 4 Sheets-Sheet 4

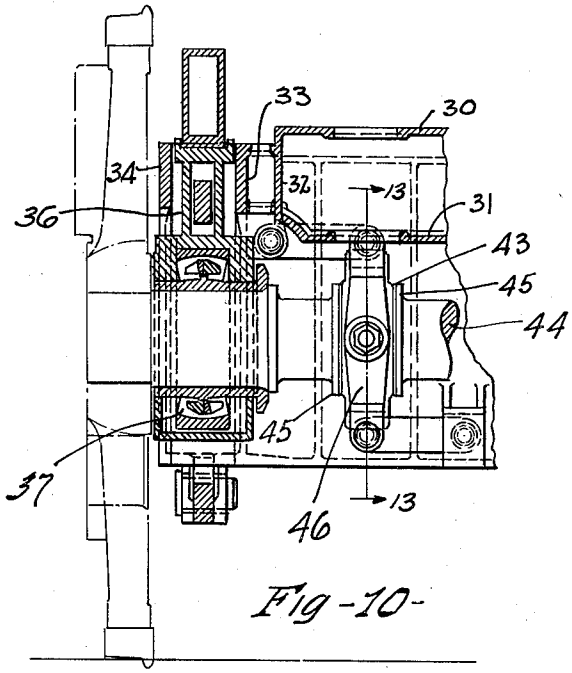


Fig-10-

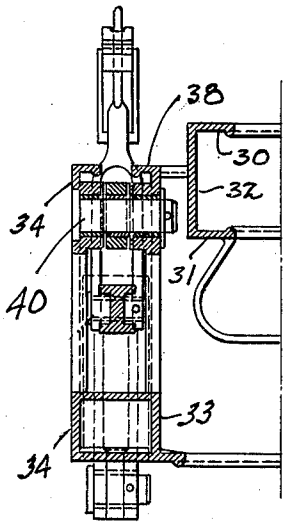


Fig-11-

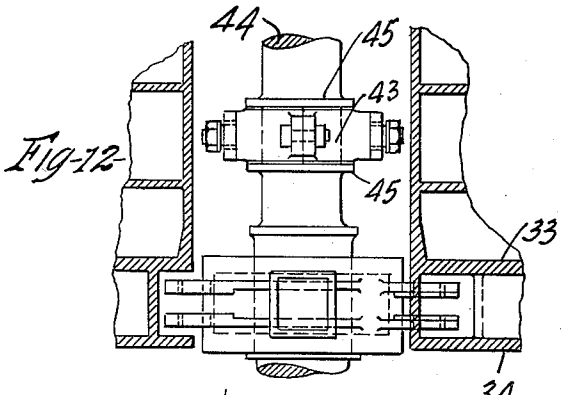


Fig-12-

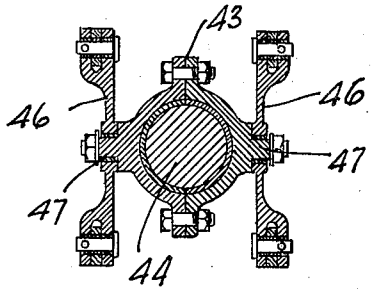


Fig-13-

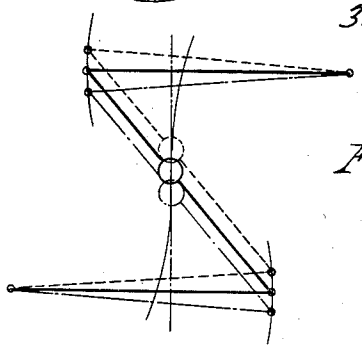


Fig-14-

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UNITED STATES PATENT OFFICE

1,971,004

RAILWAY JOURNAL BOX AND ASSOCIATED STRUCTURE

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Application June 13, 1932, Serial No. 616,882

13 Claims. (Cl. 105—218)

The invention relates to railway rolling stock and consists in a novel assembly of the frame and journal boxes of a railway vehicle.

In the usual construction, journal boxes are slidably mounted in pedestals either in the vehicle underframe or in the truck frame. The pedestals have elongated bearing surfaces for engaging the boxes and require machining, and are usually provided with liners or other wearing elements. The longitudinal forces resulting from draft, buffing, and application of brakes are transmitted between the wheels and the truck or frame through these pedestals. In locomotives there is a similar longitudinal force resulting from the piston and connecting rod thrusts.

Hence, the pedestal and box structure must be heavy enough to withstand these forces and the wear due to the sliding movements, and as a result the pedestals comprise a large portion of the material of the vehicle underframe or truck.

The main object of the present invention is to anchor the boxes to the underframe or truck by a linkage device which will transmit the forces usually transmitted through the pedestals and thereby eliminate the pedestals and simplify the construction of the vehicle and reduce its weight and cost of manufacture.

Another object of the invention is to provide a linkage as described whereby relative longitudinal or transverse movement of the boxes in the underframe or truck frame is prevented although the boxes are left free to move vertically in order for the springs carried thereby to function.

Another object of the invention is to eliminate the sliding bearings of pedestals and boxes thereby avoiding lost motion, due to wear, and the necessity of replacing wearing elements at intervals.

In the accompanying drawings the invention is illustrated as applied to a locomotive underframe and the driver boxes assembled therewith as the problems of weight, wearing surfaces, machining, lost motion, and other objectionable features of the ordinary pedestal and box arrangement are present to a striking degree in a locomotive. It is to be understood, however, that the invention may be applied to any railway vehicle journal box arrangement whether the box is assembled with the vehicle underframe or with a vehicle truck frame upon which the underframe is mounted.

In the drawings—

Figure 1 is a top view of a longitudinal half of one portion of a locomotive main frame with the drivers indicated in dot and dash lines.

Figure 2 is a side elevation of the same.

Figures 3 and 6 are vertical transverse sections taken on the corresponding section lines of Figure 2 but showing the vehicle frame only.

Figure 4 is a vertical transverse section taken on the line 4—4 of Figure 2.

Figure 5 is a side elevation of a box and adjacent axle and spacer.

Figure 7 is a section transversely of the axle and is taken on the line 7—7 of Figure 4.

Figures 8 and 9 correspond to Figures 1 and 2 but illustrate a modification.

Figures 10 and 11 are vertical transverse sections taken on the corresponding section lines of Figure 9.

Figure 12 is a horizontal section taken on the line 12—12 of Figure 9 but with some parts removed to clarify the illustration of the remaining parts.

Figure 13 is a section transversely of the axle taken on the line 13—13 of Figure 10.

Figure 14 is a diagrammatic view illustrating the action of the linkage devices.

The vehicle underframe is illustrated as a one-piece cast structure having a box-like body member with top and bottom walls 1 and 2 and side walls 3. At the sides of the body member are outwardly and downwardly projecting brackets 4 disposed in the same general plane as the journal boxes 5. These boxes are mounted upon the journals 6 of the axles 7 in the usual manner and preferably each box has an integral upstanding spring saddle 8 carrying a spring 9 from the ends of which hangers 10 depend and support the equalizers 11 fulcrumed at 12 on brackets 4 to form a continuous spring equalizing system as is in general use.

The upper portion of each box includes a pair of spaced bearings 13 for pivotally mounting one end of a substantially horizontal link 14 which extends across the top of the box through the spring saddle 8 and through the bifurcated hanger 10 and has its opposite end pivoted to a bracket 4, as indicated at 15.

The lower portion of the box diagonally opposite bearings 13 includes a bifurcated arm 16 having a pair of bearings 17 for pivotally mounting one end of a link 18 which extends across the lower portion of the box and has its opposite end pivotally connected to the lower portion of the bracket 4 on the opposite side of the box, as indicated at 19.

The linkage arrangement described comprises an embodiment of Watt's straight line motion which, as indicated in figure 14, provides for a substantial vertical movement of the central element (in this case the axle journal) but holds the same against transverse movement (in this case movement longitudinally of the frame). Accordingly, the driver box, axle and wheel may move up and down relative to the vehicle frame, permitting the spring suspension means to function, and the piston or connecting rod thrust may be transmitted to the frame through the pins 15, 19, 20 and 21 without any sliding engagement of the box and frame.

A similar transverse linkage device is best illustrated in Figures 4 and 7. This structure includes an inverted U-shaped spacer 22 straddling the axle 7 with its ends abutting the inner surfaces of journal boxes 5 on opposite sides of the locomotive. One or more vertical links 23 are pivoted at 24 intermediate their ends to spacer 22, and horizontal links 25 and 26 have corresponding ends pivoted to the upper and lower ends of links 23, respectively, and have their opposite ends pivoted to the underframe at 27 and 28, respectively. Obviously the linkage just described provides relative vertical movement of the box, axle, and frame but prevents relative movement of the axle, wheels and boxes transversely of the frame. The vertical movement accommodates tilting of the axle and boxes as results when one wheel is at a low point in the track and the other wheel is at a relatively high point. The lateral thrusts of the wheels are transmitted through the wheel hubs to the boxes and from the latter through the spacer and linkage device to the frame. This eliminates the usual bearing elements on the opposed faces of the pedestals and driving boxes.

The box-shaped body member carries the entire longitudinal forces due to the piston thrust, application of brakes, and other longitudinal buffing and pulling stresses. The brackets 4 including the pivot bearings for links 14 and 18, the bearings for the equalized fulcrum pins 12, and the bearings 29 for brake hanger lug pins preferably are integral with each other and with the central body member and this arrangement provides a simple cast bed structure having a minimum weight for the desired capacity.

The modification illustrated in Figures 8 to 13 includes a main frame body member with top and bottom walls 30 and 31, and side walls 32 corresponding generally to the body member previously described. Continuous supplemental members are provided at each side of the body member and comprise spaced vertical webs 33 and 34 which extend over the journal boxes 35, and the spring saddle 36 on the journal box projects upwardly between webs 33 and 34. The box 35 is arranged for anti-friction bearings 37 in place of the usual brass indicated in Figures 2 and 4. Horizontal webs 38 and 39 extend between vertical webs 33 and 34 and form therewith a box-shaped side member which cooperates with the central body member in transmitting longitudinal forces.

The bearings 40 and 41 for the box links and the bearings 42 for the equalizer fulcrums are formed integral with webs 33 and 34 and with this arrangement there are no eccentric forces transmitted through the vertical webs 33 and 34.

The transverse linkage (Figures 10, 12, 13) is applied to the axle by means of a two-part collar 43 surrounding axle 44 and held in place thereon by the axle flanges 45. The upright links 46 are pivoted at 47 to collar 43 and are connected to the frame as are the corresponding links previously described. This arrangement transmits the lateral thrust of the axles directly to the linkage through flanges 45 instead of through the wheel hub, the driving box and a transverse housing as previously described.

With each of the structures illustrated and described the longitudinal and transverse spacing of the wheels relative to each other and to the main frame is maintained irrespective of variations in the height of the different wheels. This desirable constant is obtained without any excessive play being required between the link pins and their bearings and without any abnormal straining of the parts. Various box and body linking arrangements have been suggested heretofore, but so far as I am aware, such arrangements produced movement of the boxes in arcs about the link pivots when the wheels moved vertically due to irregularities in rails, or for other reasons, and this has required undesirable play and/or wear in the various parts connected by the links.

While the invention is illustrated as embodied in a railway steam locomotive, it is to be understood that the features described may be embodied in other types of locomotive vehicles and in vehicle trucks which may be pivoted to the vehicle underframe by means of the usual center pin arrangement. I contemplate the exclusive use of my invention irrespective of modifications in design and details which may be required for its adaptation to different vehicle underframing or truck framing but coming within the spirit of my claims.

What is claimed is:

1. In combination, a railway journal box, a frame in which said box is mounted, and a plurality of parallel links at different levels extending transversely of said frame and pivotally connecting said box and frame, said links providing for substantially vertical relative movement of said box and frame but preventing relative movement of said box and frame transversely of the latter.

2. In combination, a railway journal box of substantial width, a frame in which said box is mounted, a link pivotally connected at one end to an upper corner of said box and extending from its pivot across the remaining portion of the top of said box and secured at its other end to said frame, and a link pivotally connected at one end to the diagonally opposite lower corner of said box and extending beneath the remaining portion of the bottom of said box and secured at its other end to said frame.

3. In combination, a railway vehicle frame structure, journal boxes at opposite sides of said frame structure, a spacer between said boxes, straight line motion linkage connecting said spacer and said frame structure and providing for vertical movement of said spacer with said boxes in said frame structure but preventing transverse movement of said boxes in said frame structure.

4. In combination, a railway vehicle frame structure, journal boxes at opposite sides of said frame structure, a spacer between said boxes, a substantially upright link pivoted intermediate its ends to said spacer, substantially horizontal links each pivoted at one end to a respective end

of said upright link and pivoted at its opposite end to said frame structure.

5. In combination, a railway journal box, a frame in which said box is mounted, a spring saddle carried by said box, a link extending through said saddle and pivotally connecting said box and said frame.

6. In combination, a railway journal box, a frame in which said box is mounted, a substantially horizontal link member pivotally connecting said box to said frame, a spring carried on said box, a substantially horizontal equalizing lever fulcrumed on said frame below the level of said link, and a hanger member suspending said lever from said spring, one of said members being bifurcated to provide for passage therethrough of the other of said members.

7. In a railway vehicle frame structure, a central box-shaped backbone member and a bracket projecting from the side of said backbone member, said bracket including spaced vertical walls having integral bearings for a journal box connecting link and a spring equalizer fulcrum pin.

8. In combination, a railway vehicle frame structure, a wheel axle, journal boxes on said axle at opposite sides of said frame structure, an inverted U-shaped spacer extending between said boxes and straddling said axle, an upright link pivoted intermediate its ends to said spacer at a point opposite said axle, and substantially horizontal links each pivoted at one end to a respective end of said upright link and pivoted at its opposite end to said frame.

9. In combination, a railway vehicle frame, a journal box having a spring saddle extending upwardly from the body of the box and bifurcated, and a box positioning link connecting said box and frame and extending along the top of said box and through said saddle.

10. In combination, a railway axle, a peripheral flange on said axle, a collar rotatably mounted on said axle and abutting said flange, a journal box mounted on said axle, and a parallel motion linkage device pivoted to said collar and said frame and limiting relative transverse movement of the same while providing for relative vertical movement thereof.

11. In combination, a railway axle, a journal box mounted thereon, a frame carried on said box, peripheral flanges on said axle spaced from each other and from said box, a split collar rotatably engaging said axle between said flanges, an upright link pivoted on said collar and horizontal links pivoted respectively to the upper and lower ends of said upright link and to the locomotive frame.

12. In a locomotive frame, a central box-shaped backbone member, and continuous members on each side of said backbone, each of said members including spaced vertical walls having integral bearings for journal box links and equalizer fulcrums.

13. In combination in a railway vehicle, a journal box, underframe structure with brackets at the sides of said box, a spring equalizer system supporting said structure from said box including equalizers fulcrumed on said brackets, and box positioning links connecting said box and said brackets.

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