June 24, 1969 J. DOWLING 3,451,354

MOTORIZED TRUCK RESILIENTLY SUPPORTED ON EQUALIZING BARS

Filed April 8, 1965 Sheet 1 of 2

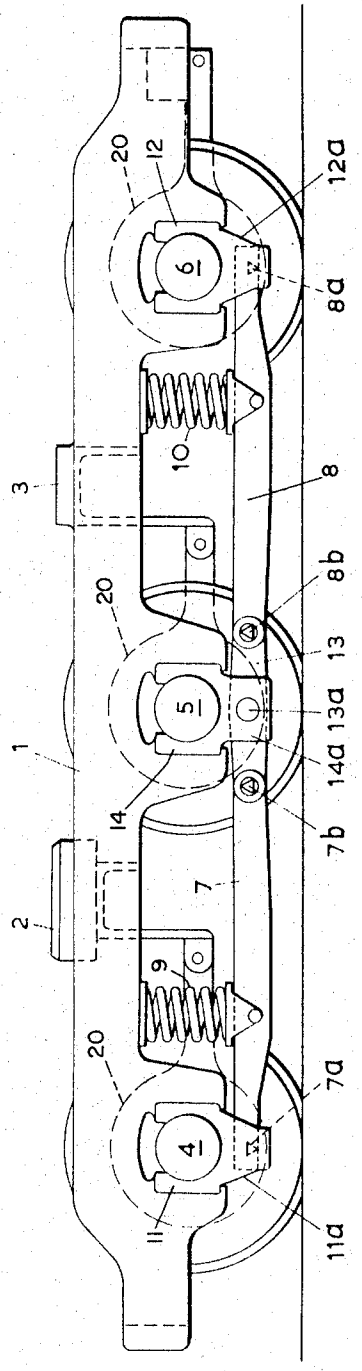


FIG. 1

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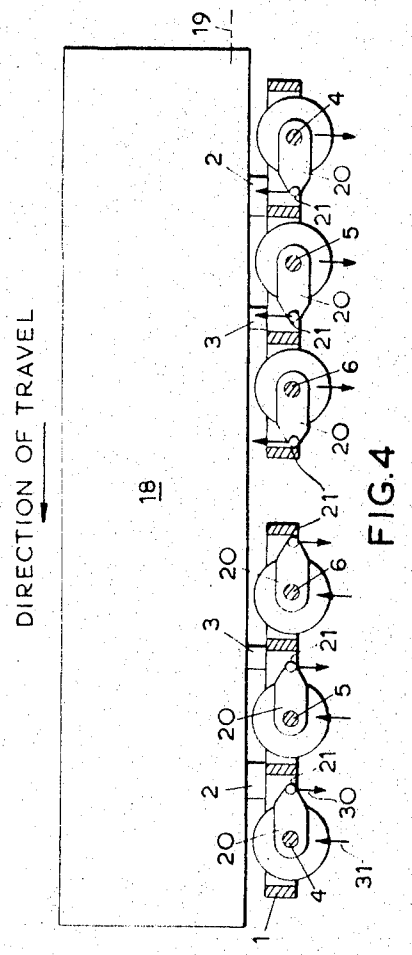


FIG. 4

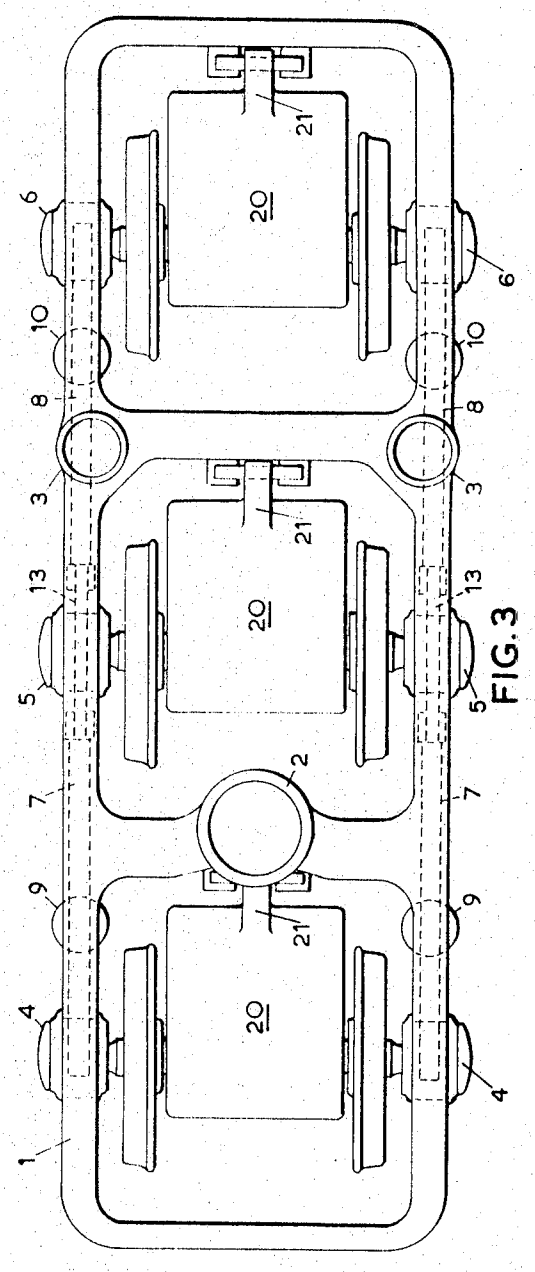


FIG. 3

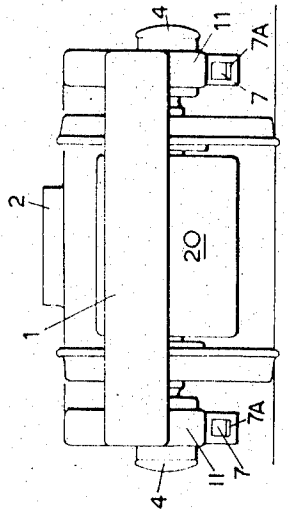


FIG. 2

United States Patent Office 3,451,354
Patented June 24, 1969

3,451,354

MOTORIZED TRUCK RESILIENTLY SUPPORTED ON EQUALIZING BARS

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Filed Apr. 8, 1965, Ser. No. 446,618
Claims priority, application Great Britain Apr. 24, 1964, 16,994/64
Int. Cl. B61c *1/00, 11/06;* B61f *5/04*
U.S. Cl. 105—133 6 Claims

ABSTRACT OF THE DISCLOSURE

A three-axled railway locomotive bogie includes a frame having three upwardly facing non-resilient suspension points by which the locomotive body can be mounted on the frame, a set of pivotally interconnected beams mounted below the axles of the bogie, a pair of helical springs connecting the two outermost beams to the underface of the frame and a nose-suspended traction motor mounted on each axle of the bogie. All of the nose-suspended motors are oriented in the same longitudinal direction. The bogie construction insures equal load distribution between axles under starting conditions.

This invention relates to bogies, and particularly, but not exclusively, relates to railway locomotive bogies.

According to the present invention there is provided a three axle bogie including means for transferring forces from the bogie frame to wheel axles comprising a set of three pivotally-interconnected beams extending along each side of the bogie frame below the axles, the arrangement being such that the beams distribute the load on the frame substantially equally between the three axles.

Still further according to the present invention there is provided a railway vehicle bogie comprising a frame, three axles, an axle box at each end of each axle, dependent stirrup means on each axle box, a beam in pivotal load-transferring relationship with each stirrup means and extending longitudinally of the bogie frame and resilient means interconnecting the frame and the beams of the outer axles, the beams extending along each side of the bogie being pivotally interconnected whereby variations in load distribution applied to the beams can be equalised to maintain the load on each axle substantially constant.

One embodiment of a railway locomotive bogie in accordance with the invention will now be described, by way of example, with reference to the accompanying drawings, in which:

FIGURE 1 is a side elevation of a railroad locomotive bogie in accordance with the invention;

FIGURE 2 is a front elevation of the bogie;

FIGURE 3 is a plan of the bogie; and

FIGURE 4 is a sectional side view diagrammatically illustrating the vertical forces acting on two bogies of a locomotive under starting conditions.

In three-axle railway locomotive bogies it is desirable to distribute the proportion of the total load carried by the bogie equally between the three axles and to reduce any transfer of load between the axles which may occur during the running of the locomotive and particularly when starting and stopping the locomotive.

Referring now to the drawings, a bogie frame **1** carries a main pivot **2** and two side bearers **3** (only one of which is shown) for supporting part of the weight of the locomotive. The main pivot **2** and side bearers **3** form parts of a three-point suspension. The bogie frame **1** is carried on three axles **4** to **6** through the intermediary of outer equilising beams **7** and **8** and heavy helical springs **9** and **10**

which are pivotally connected to the outer beams nearer to the outer axles than to the centre axle. An axlebox **11** of the axle **4** has a dependent stirrup **11***a* and an axlebox **12** of the axle **6** has a dependent stirrup **12***a*, these two stirrups respectively supporting the outer ends of the equalising beams **7** and **8** through knife edges **7***a*, **8***a* disposed on the beams directly below the centre line of the respective axle. The pivotal joints defined by knife edge bearings **7***b*, **8***b* are capable of having some differences in longitudinal adjustment or movement in connecting with the longitudinally outer end of each outer beam to an outer one of the stirrup means. The inner ends of the equalising beams **7** and **8** are pivotally connected to the opposite ends of a third, shorter, central equalising beam **13**, this beam in turn being connected through a pivot bearing **13***a* at its centre to a dependent portion **14***a* of an axlebox of the axle **5**.

Knife-edge bearing **7***b*, **8***b* provide pivotal joints between the beams **7**, **13** and **13**, **8** respectively, but alternatively pin-type bearings could be employed. The pivot means **7***b*, **8***b* have limited longitudinal movement and this is seen to correct the longitudinally outer end of each beam; therefore, the pivot means is capable of some differential in the longitudinal adjustment or movement thereof.

Nose-suspended traction motors **20** for each axle are shown in FIG. 3 and are described below.

In operation, tilting of the bogie frame **1** about a transverse axis, for example in a direction such as to impose an additional load on the spring **10**, results in a depression of the inner end of the beam **8** causing the beam **13** to turn about its pivot bearing **13***a* and to raise the inner end of beam **7** thus tending to compress the spring **9** further and to apply an additional load to the axlebox stirrup **11***a*. The transfer of load variations from one equalising beam to the other ensures the distribution of the load equally between the three axles.

In this embodiment loads are applied to the axle boxes directly beneath the vertical centre lines of the axles, which is preferable to applying the load at any other position.

The bogie hereinbefore particularly described can conveniently be used (as illustrated in FIG. 4) in a locomotive with a body **18**, a draw-bar **19** and a nose-suspended traction motor **20** for each axle, the noses **21** of the motors on any one bogie either all pointing towards or all pointing away from the centre of the locomotive. Each motor exerts an upward or downward couple **30** depending on the direction of travel, on the bogie frame **1** at each nose suspension **21** and also a direct and equal opposing force **31** of the same magnitude at each axle. For this arrangement the construction described gives rise to the advantage that (a) since the bogie frame **1** cannot tilt longitudinally relatively to the locomotive underframe and (b) since the three axles of each bogie are subject to equal loads, the net change in individual axle load arising from the motor reactions because of (a) and (b) is zero for each bogie of the locomotive.

The only variation in the load on each axle which can arise results from the couple represented by the height of the draw-bar **19** (draw-gear) above the running rail, which acts so as to reduce the load on the leading bogie and increase the load on the trailing bogie. However, the respective increase and decrease in load is distributed equally between the individual axles of each bogie. This ensures that the transfer of load between the axles of the leading and trailing bogie is kept to a minimum under starting conditions, the magnitude of the transfer being determined by the height of the draw-bar above the rails.

I claim:

1. A powered three-axle railroad vehicle bogie including

a rigid frame having
a pair of longitudinally-extending side members, and
a plurality of transverse members rigidly connected to the side members,
an upwardly-facing substantially non-resilient car body suspension means mounted on the frame including
a main pivot mounted on one of the transverse members of the frame, and
two side bearers, each mounted on a respective one of the side members of the frame,
pedestals mounted on the side members for each axle box,
three wheel-carrying axles each axle carrying a pair of wheels,
a pair of axle boxes for each axle being vertically slideably mounted in the pedestal,
a nose-suspended traction motor for each said axle, all the motors of the bogie being orientated in the same direction and supported on the transverse members, and
means for transferring inertia forces from the frame to the wheel-carrying axles comprising for each side of the bogie,
stirrup means dependent from each axle box,
a set of three longitudinally-extending load-equalizing beams lying below the axles, said set including
an intermediate beam pivotally supported at the centre thereof by the stirrup means of the centre axle box,
two outer beams,
pivot means having limited longitudinal movement connecting the longitudinally outer end of each outer beam to an outer one of the stirrup means, and
further pivot means connecting the longitudinally inner end of each outer beam to a respective end of the intermediate beam,
and resilient means connecting each outer beam to the respective longitudinally-extending side

member of the frame to support and space said frame vertically from said axle boxes,
said inertia force-transferring means serving to distribute the load on the frame substantially equally between the three axles under conditions of acceleration.

2. A bogie according to claim 1, wherein the intermediate beam of each set of beams is shorter than the outer beams.

3. A bogie according to claim 1, wherein each said resilient means comprises a helical spring pivotally secured to the respective outer beam at a position nearer to the outer axle than to the centre axle.

4. A bogie according to claim 1, wherein under conditions of substantially even load distribution on the bogie frame, each set of beams lies on a substantially straight line.

5. A bogie according to claim 1, wherein each pivot means of the outer stirrup means lies vertically below the axis of the respective axle.

6. A bogie according to claim 1 wherein said longitudinal movement is accomplished at the knife edge.

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U.S. Cl. X.R.

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