

March 27, 1934.

H. NYFFENEGGER

1,952,819

BOGIE

Filed March 30, 1933

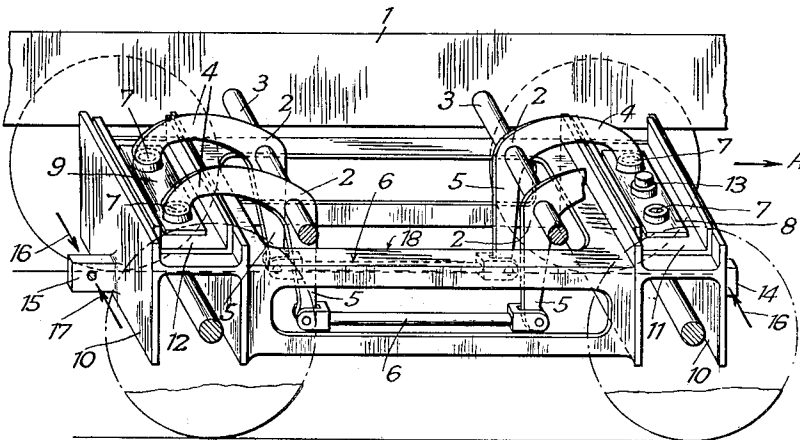


FIG. 1.

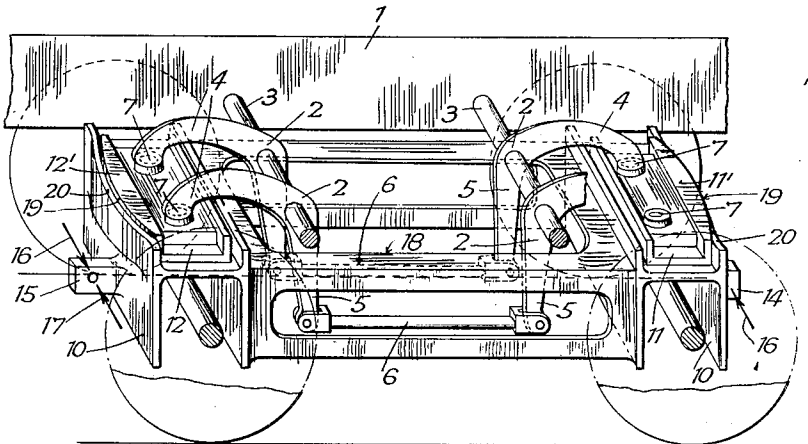


FIG. 2.

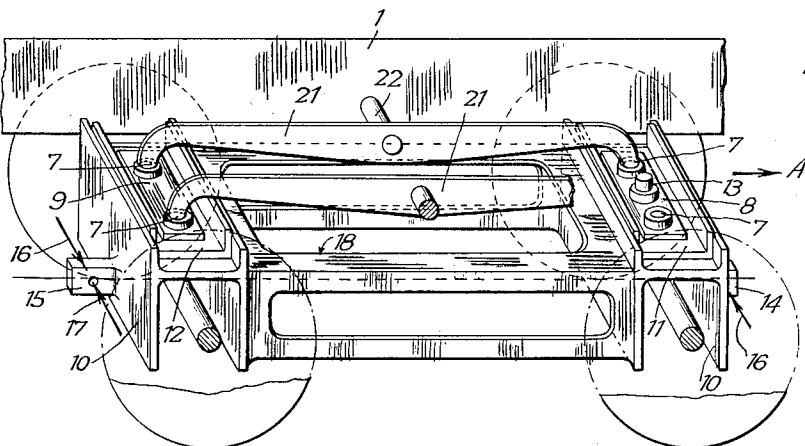


FIG. 3.

Inventor:
Hans Nyffenegger
By
Sommer & Young
Atty.

UNITED STATES PATENT OFFICE

1,952,819

BOGIE

Hans Nyffenegger, Winterthur, Switzerland, assignor to firm Schweizerische Lokomotiv- und Maschinenfabrik, Winterthur, Switzerland

Application March 30, 1933, Serial No. 663,615
In Germany April 2, 1932

5 Claims. (Cl. 105—171)

This invention relates to bogies for rail guided vehicles.

With rail guided vehicles, the amount of guidance afforded by the track for the vehicle and the adaptability of the vehicle to high speed traffic depend to a great deal on the particular construction and running qualities of the leading bogie. For this reason, this matter was given most careful attention by designers of railway vehicles from the start, as a result of which in the course of time a few standard types of bogies were derived from a great number of proposals.

The earlier constructions were based upon the principle of transmitting the load from the main frame to the individual bogie frames by means of a single pivot pin which is situated in the middle plane of the vehicle between the axles of the bogie and which provides at the same time the necessary centering for the bogie. With the adoption of large interior cylinders for steam locomotives, this construction could, however, no longer be applied, due to these cylinders requiring so much space that it became necessary to employ separate supporting and guide elements. In constructions of this kind, the pivot pin was merely used as a guide means for the bogie, whereas for the transmission of the load lateral self-adjusting supports situated between the axles of the bogie were adopted. This, resulted in much smaller dimensions for the pivot pins and associated bearings, as compared with the prior art, so that more space could be made available for the accommodation of the necessary restoring means for resetting the bogie into its middle position.

In rail guided motor driven vehicles having loose axles with gear wheels arranged above the bogie, the requirement of space for the parts of the latter is a matter of still greater importance than with steam locomotives with interior cylinders. The two devices serving entirely different purposes, viz. the supporting arrangement inclusive of the centering means for bogie and the said restoring means on the one hand, and the driving device on the other hand interfere with each other in such a detrimental manner that, hitherto, the only thing that could be done was to choose between two unsatisfactory solutions. One of these solutions consists in the arrangement of the gear wheels of the loose axles on the outside of the main frame in cantilevered disposition, and the other in disposing these gear wheels in a preferred manner between the bearings of the loose axles on the inside of the main frame.

The first mentioned arrangement rendered possible a proper design for the bogie, but in respect of the gear wheel drives, particularly when gears of a high driving effect were involved, conditions arose under which a permanently satisfactory operation of the gears was not ensured. The other arrangement resulted in very poor constructions of the bogies and sometimes even of the main frame.

According to the invention a bogie construction is provided which comprises an unobstructed space, for the accommodation of driving means and the like, between the axles of the bogie, adapting the latter for use as a leading bogie for very high speed traction.

The transmission of forces and loads from the main frame to the bogie frame is effected by supporting members in the form of two-armed levers or else by four bell crank levers that are interconnected in pairs by bars that are adapted to take tensile and compressive stresses respectively. With this arrangement the forward or rearward bell crank levers respectively can be carried by a common shaft which is mounted in the main frame. In the former construction each two-armed lever is separately mounted in the main frame. The space between the axles of the bogie is reserved for accommodating interior driving means.

In the accompanying drawing constructional forms of the invention are schematically illustrated in perspective by way of example only, in which

Fig. 1 is a view of a bogie which is particularly adapted for running in the direction of the arrow A shown and which comprises bell crank levers that are arranged interiorly of the frame on both sides thereof and interconnected by bars resistive against tension and compression for thrust transmission;

Fig. 2 shows a modification of Fig. 1, and

Fig. 3 represents a bogie which is also particularly adapted to run in the direction of the arrow A shown and which comprises two-armed levers that are arranged interiorly of the frame on both sides thereof for thrust transmission.

As shown in Fig. 1, in the main frame 1, of which only the left hand side wall is illustrated, four bell crank levers 2 for motion equalizing purposes are mounted by means of pivots 3, the arrangement being so chosen that the forward and rearward bell crank levers respectively are arranged in pairs on a common pivot. Each of the bell crank levers 2 is provided with an arm 4 of substantially horizontal disposition, and a

substantially vertically disposed arm 5 which may be downwardly directed, as shown, or else upwardly directed. The levers of the same side of the bogie frame are interconnected by bars 6 which are adapted to take tension and compression respectively. The outer ends of the arms 4 of the bell crank levers 2 bear against a pivotal plate 8 and a slide plate 9 respectively by means of shoes 7, thus transmitting the portion of the weight of the main frame to be carried by the bogie to these plates.

The double axle boxes 10 which may be integral with the bogie frame and which receive the axles and associated wheels carry slides 11, 12 which are adapted to perform lateral movements at right angles to the direction of running relatively to the double axle boxes 10. The pivotal plate 8 and the slideable plate 9 respectively are mounted in the slides 11 and 12, the pivotal plate 8 being forwardly disposed as regards the main direction of running (arrow A) and connected with the slide 11 by means of a central pivot pin 13. This pivot pin may be secured to the pivotal plate 8 or to the slide 11, so that the bogie is adapted to perform horizontal turning movements relatively to the main frame while it is dragged along by this frame. On the other hand the slides 11 and 12 permit displacements of the bogie parallel to the same also in the distorted positions of the bogie. The transmission of the loading from the bogie frame to the axles of the bogie is effected, in a known manner, by intervening springs and equalizing levers for lateral shifting movements which, for the sake of clearness, are not shown in the drawing. The same applies to the usual restoring device for resetting the bogie into its middle position and comprising elements, such as bell crank levers provided with rollers, linkages and springs, and acting on the bogie forwardly and rearwardly at the outer ends thereof, as at 14 and 15, in the directions of the arrows 16 or 17 respectively. The space 18 between the double axle boxes is reserved for the accommodation of gear wheels and other driving members and so forth. The fact that while running in the opposite direction to that indicated, by the arrow A, the bogie is pushed along by the main frame is irrelevant, as during the rearward movement the speed of the vehicle is always much smaller than during the forward movement.

In the constructional example of the invention, as shown in Fig. 2, which, however, is equally suitable for forward and rearward running, instead of the arrangement of a pivot pin, for interconnecting the main frame and the bogie frame, cylindrical bearing faces 19 are provided on the slides 11' and 12' for cooperation with counter bearing faces 20 on the bogie frame. Clearance is provided between the inner sides of the slides 11 and 12 and the corresponding facings of the axle boxes in which the slides are located to permit the turning motion of the bogie.

In the constructional example of the invention illustrated in Fig. 3 the transmission of the loading from the main frame to the bogie is effected by means of two-armed levers 21 disposed interiorly of the bogie frame and mounted in the main frame by means of pivot shafts 22. The two-armed levers rest with their shoes 7 against the pivotal plate 8 and the slidable plate 9 respectively, thus transmitting the portion of the weight of the main frame to be counteracted by the bogie to these plates. Alternatively, the

slide 12 may be omitted or replaced by an immovably arranged bearing plate.

The supporting device for transmitting the weight of the main frame to the bogies can be modified in various ways, but so that in every case a free space 18 is provided between the two axles, for receiving driving members and the like.

It will be readily seen that also the constructional form of the invention as per Fig. 3 may be modified on the principle as disclosed in Fig. 2, i. e. by replacing the pivot pin 13, shown in Fig. 3, by two pairs of correlated cylindrical bearing faces, as illustrated in Fig. 2.

Instead of using four individual levers interconnected in pairs by connecting bars or two-armed levers, as shown in the Figs. 1 and 3 respectively, a single pair of levers or a single two-armed lever may be employed. Alternatively, two individual levers may be provided for the forward slide and only one individual lever for the rearward slide, the forward levers being provided with depending arms, as shown in Fig. 1, whereas the corresponding arm of the rearward lever is fork-shaped for engaging the two connecting bars extending backwardly from the two forward levers.

I do not limit myself to the particular size, shape, number or arrangement of parts as shown and described, all of which may be varied without going beyond the scope of my invention as shown, described and claimed.

What I claim is:

1. In a two-axle bogie for rail guided vehicles, in combination, a main frame of the vehicle, a bogie frame, carrying a portion of the weight of said main frame, a motion equalizing leverage intercalated between said main frame and said bogie frame, a forward and a rearward double axle box arranged in said bogie frame, a slide mounted in each axle box and adapted to freely shift relatively to the box in the transverse direction of the vehicle, and an adjustable bearing plate disposed for said leverage in each of said slides, the whole arrangement suchwise, that an unobstructed space is provided between said forward and rearward double axle boxes.

2. In a two-axle bogie for rail guided vehicles, in combination, a main frame of the vehicle, a bogie frame, carrying a portion of the weight of said main frame, a motion equalizing leverage intercalated between said main frame and said bogie frame, a forward and a rearward double axle box arranged in said bogie frame, a slide mounted in each axle box and adapted to freely shift relatively to the box in the transverse direction of the vehicle, a slidable bearing plate disposed for said leverage in the slide of said rearward double axle box, a pivotal bearing plate disposed for said leverage in the slide of said forward double axle box, and a vertical pivot pin inserted between the slide of said forward double axle box and said pivotal bearing plate and adapted to transmit the advance movement of said main frame to said bogie frame, the whole arrangement suchwise, that an unobstructed space is provided between said forward and rearward double axle boxes.

3. In a two-axle bogie for rail guided vehicles, in combination, a main frame of the vehicle, a bogie frame, carrying a portion of the weight of said main frame, a motion equalizing leverage intercalated between said main frame and said bogie frame, a forward and a rearward double axle box arranged in said bogie frame, a vertical

5	cylindric bearing face on each of said double axle boxes, a slide mounted in each axle box and adapted to freely shift relatively to the box in the transverse direction of the vehicle, a vertical	and adapted to freely shift relatively to the box in the transverse direction of the vehicle, and an adjustable bearing plate disposed for said levers in each of said slides, the whole arrangement suchwise, that an unobstructed space is provided between said forward and rearward double axle boxes.	80
10	slides mating the bearing face of the correlated axle box and adapted to alternately transmit the advance movement of said main frame to said bogie frame, a slidable bearing plate disposed for said leverage in each of said slides, the whole arrangement suchwise, that an unobstructed space is provided between said forward and rearward double axle boxes.	5. In a two-axle bogie for rail guided vehicles, in combination, a main frame of the vehicle, a bogie frame, carrying a portion of the weight of said main frame, at least one two-armed lever for motion equalization intercalated between said main frame and said bogie frame interiorly of the latter, a forward and a rearward double axle box arranged in said bogie frame, a slide	85
15	4. In a two-axle bogie for rail guided vehicles, in combination, a main frame of the vehicle, a bogie frame, carrying a portion of the weight of said main frame, at least one bell crank lever for motion equalization intercalated between said main frame and said bogie frame in the forward and rearward portion of the latter respectively, a connecting bar adapted to take tensile and compressive stresses inserted between each pair of correlated motion equalizing levers, a forward and a rearward double axle box arranged in said bogie frame, a slide mounted in each axle box	mounted in each axle box and adapted to freely shift relatively to the box in the transverse direction of the vehicle, and an adjustable bearing plate disposed for adjacent ends of said two-armed levers in each of said slides, the whole arrangement suchwise, that an unobstructed space is provided between said forward and rearward double axle boxes.	90
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