Nov. 14, 1939. O. K. KJOLSETH 2,180,149

LOCOMOTIVE BOILER SUPPORTING ARRANGEMENT

Filed July 12, 1938

Fig. 1.

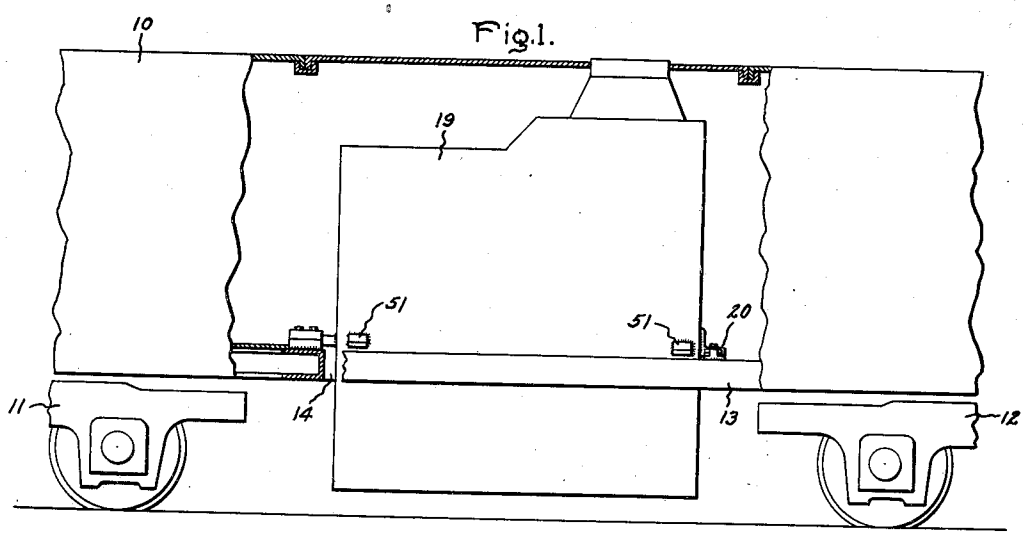


Fig. 2.

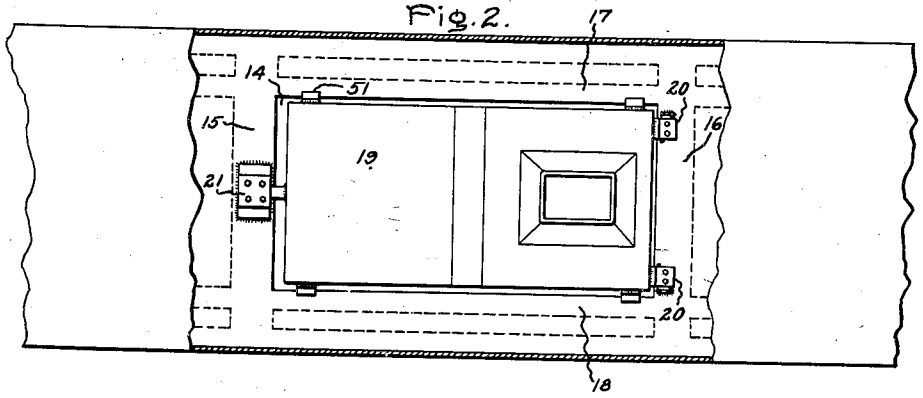


Fig. 3.

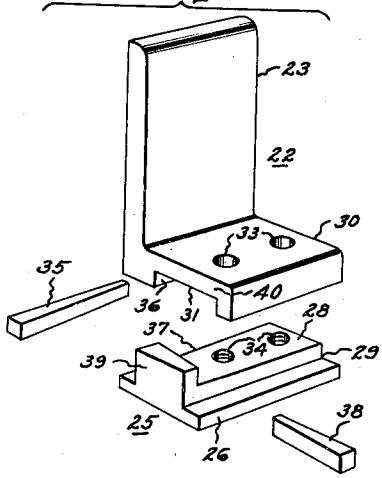


Fig. 4.

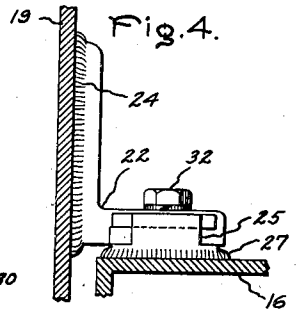


Fig. 5.

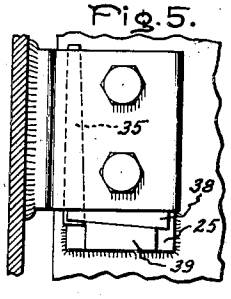
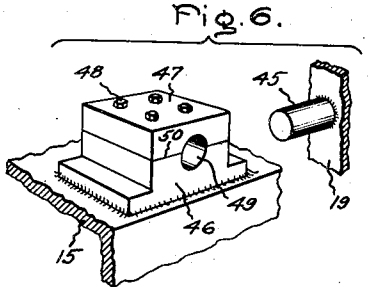


Fig. 6.



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2,180,149

LOCOMOTIVE BOILER SUPPORTING ARRANGEMENT

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Application July 12, 1938, Serial No. 218,784

7 Claims. (Cl. 105—43)

This invention relates to locomotive vehicles and more particularly to means for supporting a boiler upon the framework of such a vehicle.

In modern light weight locomotives designed for high speed operation it is desirable that the weight of the power plant equipment be kept at a minimum. In such locomotives compact and self-contained high pressure boilers are embodied, the walls of which boilers are of relatively light weight metal determined largely by the internal pressures and stresses resulting therefrom. Accordingly, torsional or warping movements of the vehicle framework as the locomotive passes over uneven roads and other external stresses should be insulated from the boiler so as to minimize the danger of failure thereof due to external mechanical strains.

It is an object of this invention to provide an improved arrangement for mounting a boiler upon a locomotive framework so as to minimize the transmission of warping movements from the framework to the boiler.

For a consideration of what I believe to be novel and my invention, attention is directed to the following description and the claims appended thereto taken in connection with the accompanying drawing.

In the drawing

Fig. 1 is an elevational view, partly in section, of a locomotive vehicle embodying my invention; Fig. 2 is a plan view of the vehicle shown in Fig. 1; Figs. 3–5 inclusive are detail views of the supporting means for one end of the boiler and Fig. 6 is a detail view of the supporting means for the other end of the boiler.

In Figs. 1 and 2 is shown a locomotive vehicle comprising a cab structure 10 mounted upon forward and rear driving trucks 11 and 12 respectively. The longitudinal framework 13 extending between the trucks and supporting the locomotive apparatus is provided with an opening 14 between the forward and rear driving trucks defined by transverse frame members 15 and 16 and side members 17 and 18 respectively. The boiler 19, which may be lowered into position through an opening in the roof, is supported in the opening of the framework, the lower portion of the boiler being adapted to depend downwardly from the framework between the forward and rear driving trucks. This method of mounting the boiler is advantageous, not only for securing a more balanced suspension thereof, but also makes possible the installation of a highly efficient vertical tube type boiler so as to occupy a minimum of space within the cab and at the same time retain the overall height of the locomotive within allowable limits.

According to my invention, I provide a three-point suspension arrangement for supporting the boiler within the frame opening. One end of the boiler is substantially rigidly secured to the transverse frame member 16 by two suitably spaced apart supporting devices 20 while the opposite end of the boiler is supported at a single point upon the second transverse frame member 15 by a trunnion arrangement 21. The devices 20 are preferably spaced as widely apart as permissible and in such a manner that the weight at that end of the boiler distributes equally between them. The trunnion arrangement 21 at the opposite end of the boiler is preferably arranged at the central point as regards the width of the boiler and so that the weight is substantially balanced on each side thereof.

One of the two similar supporting devices 20 is shown in greater detail in Figs. 3–5 inclusive and comprises a right-angle bracket member 22 the vertical portion 23 of which is secured, as by welds 24, to the end wall of the boiler 19. The cooperating block 25 comprises a base portion 26 which is secured as by welds 27 to the transverse frame member 16. A raised block portion 28 is formed on the upper surface of the base 26 as by milling suitable grooves 29 along the opposite upper edges of the seating block. The horizontal foot portion 30 of the angle bracket 22 is provided at the under side with a slot 31 for fitting over the raised portion 28 of the seating block, the depth of the slot 31 being substantially equal to the height of the raised portion 28. After the boiler is positioned with the feet 30 resting upon the seating blocks 25, it may be fastened securely in position against vertical movements by means of screws 32 inserted through the slightly enlarged holes 33 provided in the feet and threaded into the aligned bores 34 in the seating block. To relieve the screws from any shearing stress due to relative horizontal movements between the seating block 25 and the bracket 22 by reason of vibration of the locomotive vehicle or other causes, I prefer to insert wedges between the adjacent shoulders on the seating block and the foot of the bracket member prior to the tightening of the screws 32. To enable a wedge of suitable size to be used for this purpose the slot 31 on the under side of the bracket foot 30 may be formed slightly wider than the width of the raised portion 28 of the seating block and relatively tapered. With the boiler seated and before the screws 32 are tight-

ened, the tapered wedge 35 may be driven into the clearance space between the shoulder 36 on the foot of the bracket and the side 37 of the raised portion 28 of the seating block as shown in Fig. 5. To accommodate a second wedge 38, the seating block 25 is provided with a portion 39 extending upwardly from one end of the base portion 26 forming a tapered slot between it and the end 40 of the foot 30. The wedges are first driven only lightly into position so that the holes 33 and 34 will be in concentric alignment. The screws 32 should then be applied and securely tightened. The wedges may then be driven tight and suitably secured as by tack welding to prevent loosening in service. By this arrangement it is seen that the right end of the boiler upon which these supporting devices are used is substantially rigidly anchored to the frame structure.

The trunnion supporting arrangement 21 for the left end of the boiler, as shown in detail in Fig. 6, comprises a cylindrical member 45 suitably secured perpendicularly onto the left end wall of the boiler 19. The cooperating seating block comprises a lower or base portion 46 suitably secured, as by welding, to the transverse frame member 15, and a cap portion 47 removably secured onto the lower portion by screws 48. A bore 49 is provided in the seating block for cooperatively receiving the cylindrical member 45. Shoulders 50 are provided between the base and cap portions so that a desired clearance may be maintained between the member 45 and the walls of the bore 49. By this trunnion supporting arrangement it will be seen that warping movements of the longitudinal frame members 17 and 18 and resultant relative rotational movements between the transverse frame members 15 and 16 may take place without such movements being transmitted to the boiler structure. Upon such torsional movements occurring, the boiler will follow the movements of the transverse frame member 16 to which it is rigidly secured at the one end, the cylindrical member 45 pivotally rotating relatively to the seating block. Longitudinal movements of the frame occasioning differences in the separation of the transverse members, and movements due to expansions of the boiler structure by reason of variations in operating temperatures, may take place freely without imposing any strains upon the boiler structure since the cylindrical member 45 may slide longitudinally within the bore 49. Relative vertical movements of the boiler 19 with respect to the frame member 15, however, are precluded by the cap portion 48 which retains the cylindrical member 45 upon the seating block at all times.

Auxiliary brackets are provided for supporting the boiler upon the failure of either of the supports 20 or 21. As indicated in Figs. 1 and 2 a plurality of angle brackets 51 are secured along opposite side walls of the boiler. It is understood that these brackets do not normally rest upon the side frame members 17 or 18 but are spaced slightly thereabove and rest upon the side members to support the boiler only upon the failure of either of the supporting devices 20 or 21.

Having described my invention together with the apparatus which I now consider to represent the best embodiment thereof, I desire to have it understood that the apparatus shown is only illustrative and that the invention may be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a locomotive vehicle, a framework for said vehicle, a boiler of relatively light weight construction, removable means for rigidly securing one end of said boiler to said framework, means for supporting the opposite end of said boiler upon said framework comprising a rest secured to said framework having an arcuate upper seating surface, the axis of curvature thereof being parallel to and in vertical alignment with the horizontal longitudinal axis of said boiler, a bearing block secured to said boiler provided with a lower arcuate surface for cooperatively seating on the upper surface of said rest, removable means for movably retaining said bearing block upon said rest whereby twisting and longitudinal movements of said framework relative to said boiler may take place without stressing said boiler.

2. In a locomotive vehicle, a boiler mounted on the frame of said vehicle, means for rigidly supporting one end of said boiler on said framework, means for pivotally supporting the opposite end of said boiler at a single centrally disposed point upon said framework so as to allow relative torsional and translatory movements between said boiler and said framework without stressing said boiler and means for precluding relative vertical movements between said boiler and said framework.

3. In a locomotive vehicle, a boiler mounted on the frame of said vehicle, means for rigidly supporting one end of said boiler on said framework, means for pivotally supporting the opposite end of said boiler at a single centrally disposed point to said framework so as to substantially preclude longitudinal and warping stresses due to twisting of the locomotive vehicle framework from being transmitted from said framework to said boiler structure.

4. In a railway locomotive vehicle having forward and rear driving trucks and a longitudinal base framework having an opening between said trucks, the combination of a boiler supported in said opening, means rigidly securing one end of said boiler to one member of said framework, means for supporting the opposite end of said boiler upon a second member of said framework so as to allow relative rotational movements and relative longitudinal movements between said second frame member and said boiler.

5. In a railway locomotive vehicle having forward and rear driving trucks and a longitudinal framework having an opening between said trucks, the combination of a boiler supported in said opening, separable means for rigidly securing one end of said boiler to one adjacent frame member, a cylindrical member secured to the opposite end of said boiler extending parallel to and in vertical alignment with the longitudinal horizontal axis of said boiler, a seating block having a bore for cooperatively receiving said cylindrical member secured onto a second adjacent frame member.

6. In a locomotive vehicle, forward and rear driving trucks, a longitudinal framework extending between said trucks, an opening in said framework between said driving trucks, a boiler, said boiler being mounted in said opening so that the lower portion of said boiler depends below said framework and between said driving trucks, means rigidly securing one end of said boiler at two spaced apart points to a transverse member of said framework, means for movably supporting the opposite end of said boiler at a single point upon a second transverse frame member, said last mentioned means comprising a rest se-

cured to said framework having an arcuate upper seating surface, the axis of curvature thereof being parallel to and in vertical alignment with the horizontal longitudinal axis of said boiler, a member secured to said boiler adapted to cooperatively seat on the upper surface of said rest, and removable means for retaining said member upon said rest surface.

7. In a locomotive vehicle, the combination comprising forward and rear driving trucks, a longitudinal framework extending between said trucks, an opening in said framework between said trucks, a housing on said framework, a boiler, said boiler being adapted to be lowered into position through an opening in the roof of said housing and mounted in said framework opening so that the lower portion of said boiler depends below said framework and between said driving trucks, a pair of spaced apart rests on a transverse frame member adjacent one end of said boiler, brackets secured to the corresponding end of said boiler adapted to cooperatively seat on said rest and be rigidly and removably secured thereto, a seating block on a transverse frame member adjacent the opposite end of said boiler, a member extending outwardly from the corresponding end of said boiler and centrally disposed as regards the weight distribution of said boiler adapted to cooperatively seat on said last mentioned rest, and removable means for movably retaining said member on said last mentioned rest.

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