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GEARED LOCOMOTIVE FRAME AND BOILER SUPPORT

Filed Oct. 5, 1922

2 Sheets-Sheet 1

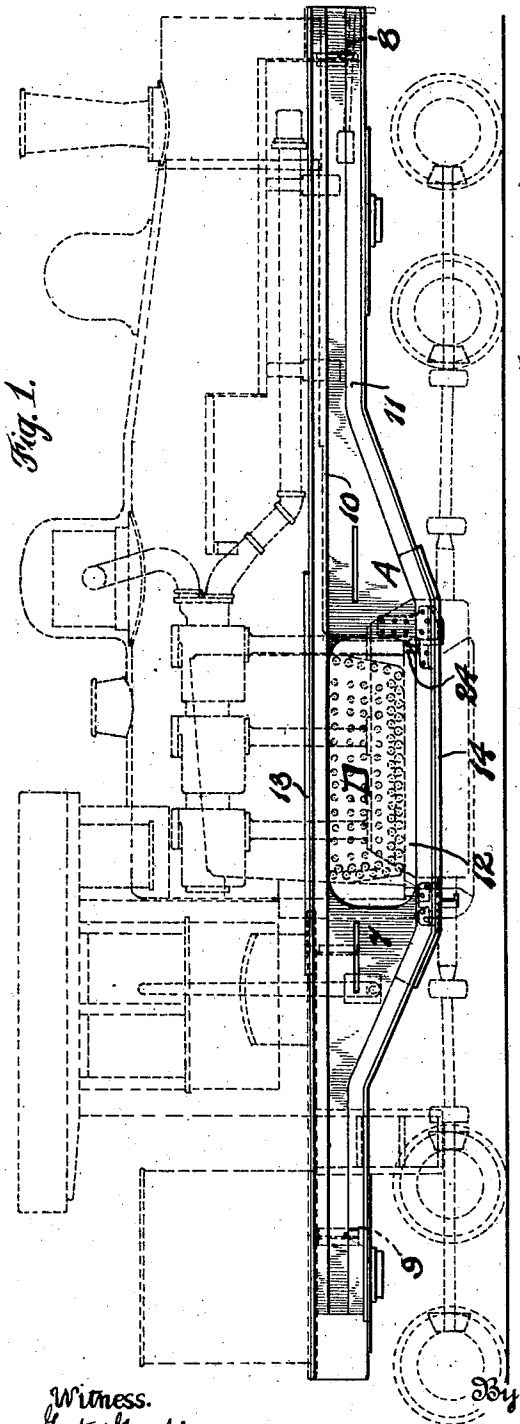


Fig. 1.

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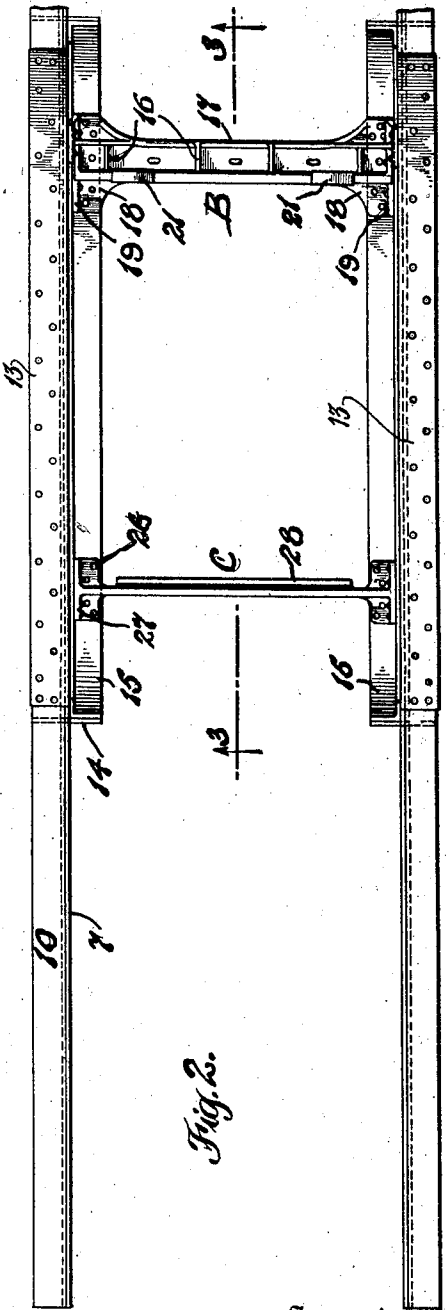


Fig. 2.

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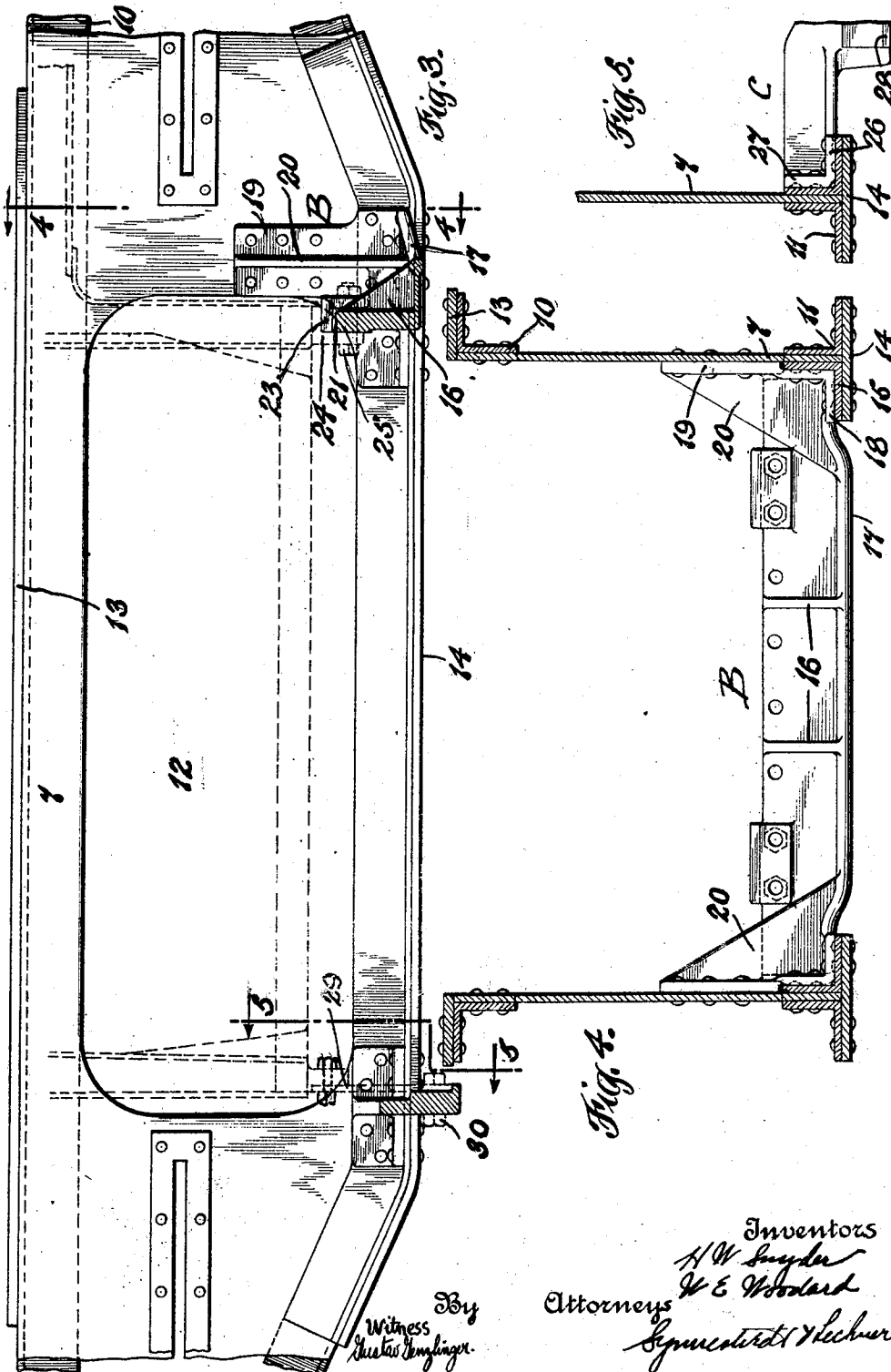
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UNITED STATES PATENT OFFICE.

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GEARED LOCOMOTIVE FRAME AND BOILER SUPPORT.

Application filed October 5, 1922. Serial No. 592,481.

To all whom it may concern:

Be it known that we, WILLIAM E. WOODARD and HERBERT W. SNYDER, both citizens of the United States, respectively residing at Forest Hills, in the county of Queens and State of New York, and at Lima, in the county of Allen and State of Ohio, have invented certain new and useful Improvements in Geared Locomotive Frames and Boiler Supports, of which the following is a specification.

This invention relates to frames and boiler supports for geared locomotives such, for example, as those of the Shay type.

The frames heretofore used for geared locomotives have been composed of side and cross members, the side members usually being of I-beam construction. One of the difficulties encountered in connection with this construction has been that the side members of the frame cover up the stay bolts in the water legs of the boiler, rendering them inaccessible for inspection or repair. An attempt has been made to provide inspection for the stay bolts by drilling a number of holes through the side frame members but in practice this expedient has not proven to be successful because of the difficulty of registering the holes in the frames with the stay bolts in the boiler and also because of the fact that these holes offer comparatively poor access to the bolts.

In addition, the boiler has been supported by pads studded to the side members of the fire box and clips bolted to the top of the frame. The pads cover up a number of the stay bolts and, moreover, the type of construction often leads to breakage of or leakage at the studs which attach the pads to the boiler.

It is one of the primary objects of our invention to provide an improved frame which overcomes the difficulty of stay-bolt inspection and renewal; and which also provides an improved arrangement of boiler support and obviates the difficulty in this regard heretofore noted.

Our invention also contemplates an improved manner of supporting the boiler which is more effective and is least affected by expansion and contraction of the boiler.

The foregoing, together with such other objects and advantages as may hereinafter appear or are incident to the invention shown and claimed, we accomplish by means

of a construction which we have illustrated in preferred form in the accompanying drawings, wherein:

Fig. 1 illustrates the improved frame in side elevation, the other locomotive parts being indicated in dotted lines; Fig. 2 is a plan view of the frame shown in Fig. 1; Fig. 3 is an enlarged section taken on the line 3—3 of Fig. 2; Fig. 4 is a section taken on the line 4—4 of Fig. 3; and Fig. 5 is a section taken on the line 5—5 of Fig. 3.

Referring now to Fig. 1, a typical Shay locomotive is indicated in dotted lines, in so far as superstructure and driving mechanism is concerned. The frame of the locomotive, indicated as a whole by the reference character A, however, is composed of the following parts: A pair of side plates 7, of girder form, are connected at front and rear by ties such as cross ties 8 and 9 and, intermediate their ends, by combined cross ties (or braces) and boiler supports B and C. The side plates 7 each have an angle 10 secured thereto along their upper edges on the outer face and with a similarly disposed angle 11 at their lower edge. In their intermediate or "swell" portion, the side plates are cut away to provide a large opening 12, coming opposite the sides of the fire box D, exposing practically all of the stay bolts and making them readily accessible for inspection and renewal. To compensate for the material cut away in the side plates, i. e., in the web of the girder, a plate 13 is added to the top and a plate 14 to the bottom of each girder or side member, such plates being suitably riveted or otherwise secured. Additional strength is had by virtue of the angles 15 of which there is one secured to the inner face of each side plate at the lower edge. The plates 14 are coextensive with the angles 11 and 15. The angles 15 serve an additional function in that they act as a footing for the boiler supports B and C.

The combined cross braces and boiler supports B and C will now be described. The member B comprises a steel casting which is substantially angle-shaped in cross section and is provided with strengthening ribs 16, a reinforcing bead 17 and with suitable flanges 18 and 19 for attachment to the angles 15 and the side plates 7, respectively. The flanges 19 are reinforced by the fins 20. Pads 21 are provided for the shoes 23 (see Fig. 3). These shoes are provided in order

to accommodate for small irregularities in boiler construction, the shoes being fitted in the erecting shop between the boiler support cross ties and the boiler mud ring 24. The top portions of the shoes are of excess thickness to allow for the machining necessary to compensate for such irregularities. It will be seen, therefore, that in contradistinction to the old practice, by our arrangement the fire box of the boiler is carried directly on the member B through the medium of the shoes 23 on which the mud ring 24 rests. Bolts 25 secure the mud ring to the member B.

The combined cross brace and boiler support C comprises a casting extending between the side members and provided with flanges 26 and 27 for bolting to the angles 15 and the side plates, respectively. This casting is provided with a ledge 28 at the bottom for carrying an expansion bearer 29 such as ordinarily used in locomotive practice. The expansion member is bolted to the cross brace C by means of the bolts 30 and the rear portion of the mud ring is secured to the upper portion of the expansion bearer.

By this arrangement, the boiler is supported through the medium of the mud ring and the use of attaching brackets and clips resting on top of the side plates and studded to the shell of the boiler is obviated and the disadvantages incident thereto overcome. Where the boiler is supported by clips or brackets, as above described, heavy strains are placed on the attaching studs because of the expansion and contraction and weaving of the boiler, and this, among other things, causes leakage and breakage of the points of attachment. The combined boiler supports and cross braces connect the side plates adjacent the ends of the openings therein, thus affording strength at such points.

The front end of the boiler is supported from a cross tie 8 in the usual manner with freedom for longitudinal movement but no vertical or lateral motion. The points of boiler support are, therefore, low, which also presents some features of advantage.

We claim:

1. The combination in a geared locomotive of a boiler having a mud ring, a frame, and means on the mud ring whereby the boiler is supported on the frame by the mud ring, the mud ring being secured to the frame with expansion from the point of attachment.

2. In a geared locomotive, the combination of a boiler having a mud ring and a frame, the mud ring being carried on the frame, the mud ring being secured to the frame with expansion from the point of attachment.

3. In a geared locomotive, the combination of a boiler having a mud ring, and a frame, comprising side members and cross members, the mud ring being supported on the cross members.

4. In a geared locomotive, the combination of a boiler having a mud ring, and a frame comprising side members and combined cross brace and boiler supporting members, the mud ring being carried on said last members.

5. In a geared locomotive, the combination of a boiler having a mud ring and a frame comprising girder-shaped side members and combined cross brace and boiler supporting members connecting the lower portions of the side members, the mud ring being carried on said cross brace and boiler supporting members.

6. In a geared locomotive, the combination of a boiler having a fire box and a frame composed of side members each cut away to provide an opening coming opposite a side of the fire box to expose stay bolts.

7. In a geared locomotive, a supporting frame comprising girder-like side members cut away to provide an opening opposite the sides of the fire box and the boiler and provided with reinforcing means compensating for the material cut away.

8. In a geared locomotive, a supporting frame comprising side plates having a reinforcing angle at the top and bottom, the side plates being cut away to provide openings coming opposite the sides of the fire box and the boiler, and additional reinforcing means at top and bottom compensating for the material cut away.

9. In a geared locomotive, a supporting frame comprising side members having combined reinforcing and foot members, and boiler supports carried on said members.

10. In a geared locomotive, a frame comprising side plates each having a combined reinforcing and foot member, and combined cross braces and boiler supports carried on said members.

11. In a geared locomotive, a frame comprising side members each having a combined reinforcing and foot member, and a combined cross brace and boiler support carried on said foot members.

12. In a geared locomotive, a supporting frame comprising side girders each having an opening therein to expose the sides of the fire box and the boiler, and cross members connecting the side members at points near said openings.

In testimony whereof, we have hereunto signed our names.

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