Feb. 24, 1953 J. F. CAUSEY 2,629,556

RAIL JOINT BAR AND RAIL JOINT PREPARED THEREWITH

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Fig. 1.

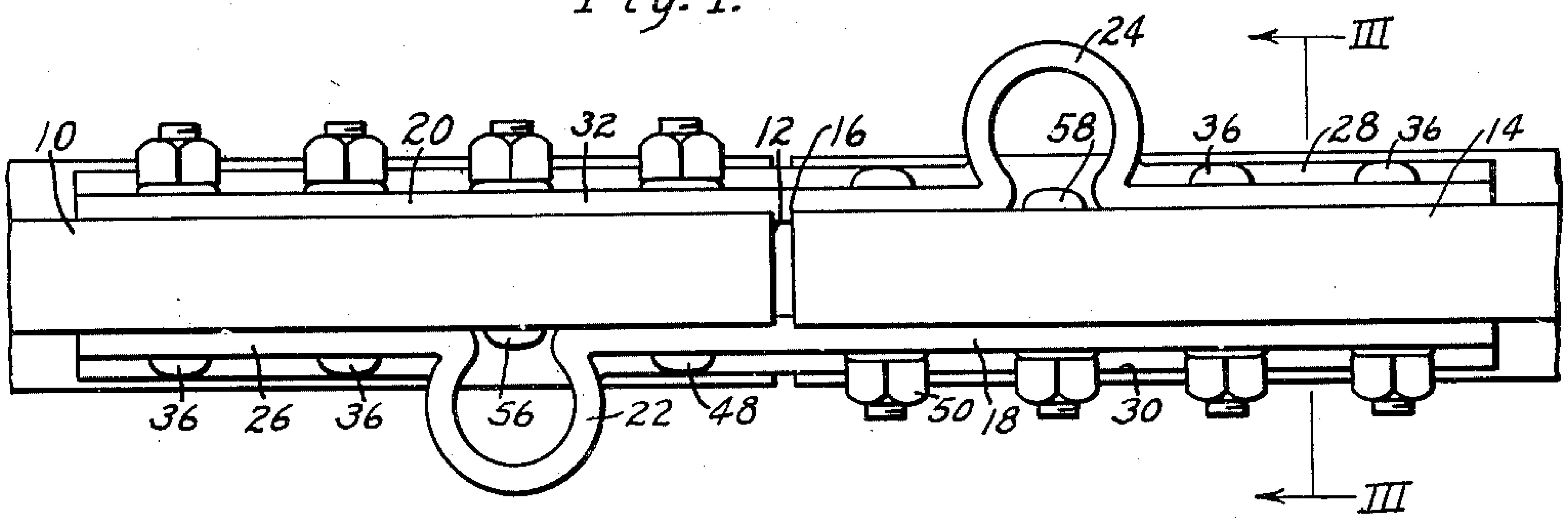


Fig. 2.

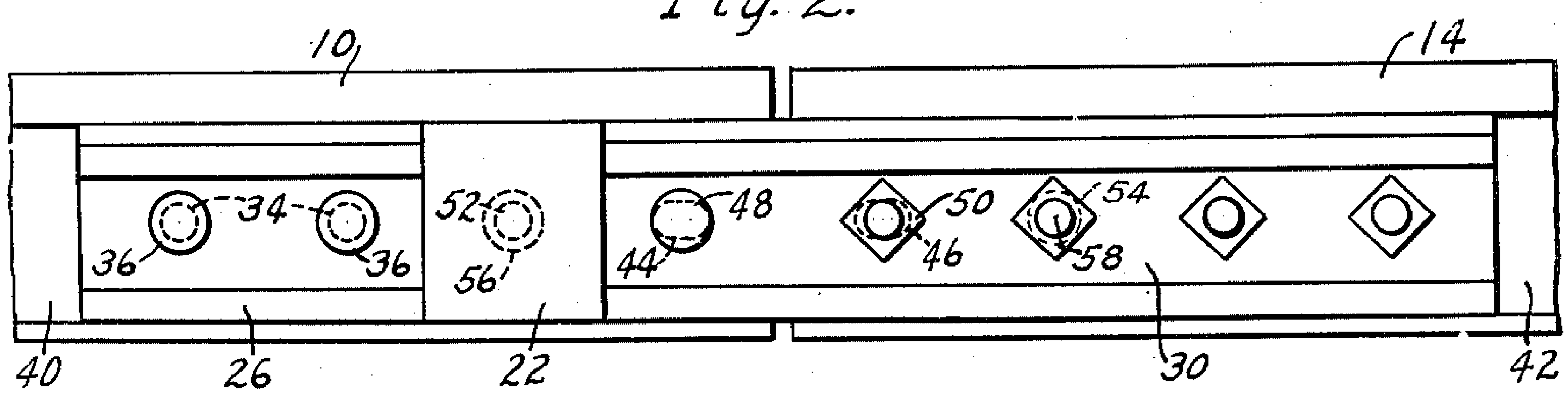
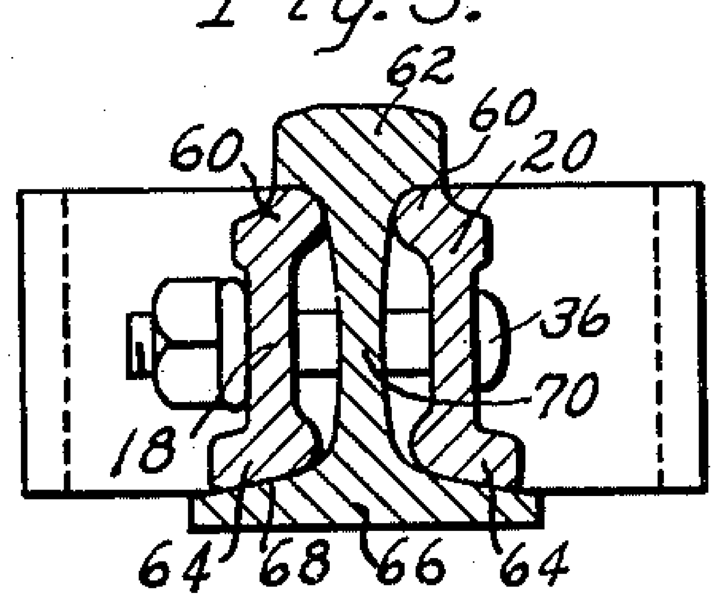


Fig. 3.



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RAIL JOINT BAR AND RAIL JOINT PREPARED THEREWITH

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1 Claim. (Cl. 238—259)

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This invention relates to novel rail joint bars and improved rail joints prepared therewith.

At the present time, the ends of consecutive rails are joined together to form a track by bolting a pair of joint bars to either side of each rail end. Practically all of the joint bars employed commercially comprise rigid longitudinal members that have no capacity or means therein for compensating for or absorbing the relative expansion and contraction of the rails joined. To accommodate the expansion and contraction of rails due to changes in temperature, it is conventional to provide elongated bolt apertures in the joint bars so that there may be relative sliding between the ends of the two joined rails and the joint bars. The bolts applied to unite the joint bars and the rails are not tightened more than will permit such sliding action to take place readily between the rail and the joint bar.

Certain disadvantages follow from this relatively loose assemblage of rails and joint bars. One problem is that of insuring a sufficiently tight bolting together of the joint bars and the rails so that the joint bars, in effect, constitute a supporting girder traversing the space between the ends of the rails joined together. Any looseness between the joint bars and the rails permits lateral and vertical misalignment and movement of the rail ends with respect to one another. This exaggerates rail click when rolling stock passes over the joint. Also there takes place pounding or hammering of the rail ends when rolling stock passes from one rail to another at a joint at which the rail ends are not rigidly maintained in alignment. Also the rail ends flex excessively under load and damage the ties. Numerous other disadvantages and difficulties occur that lead to failure of the rails and at times accidents follow from the use of such previous joint constructions.

The object of this invention is to provide a rail joint bar that may be applied rigidly to the ends of rails laid end to end to produce a joint that is rigid both laterally and vertically while permitting adequate accommodation of the normally expected expansion and contraction of the rails so joined.

A further object of the invention is to provide a rail joint that is capable of adequately withstanding all the required service strains without having excessive lateral and vertical movement while permitting accommodation of thermal expansion and contraction of the rails.

Other objects of the invention will in part be obvious and will in part appear hereinafter. For

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a better understanding of the nature and objects of the invention, reference should be had to the following detailed description and drawing, in which:

Figure 1 is a plan view of a rail joint constructed in accordance with the invention,

Fig. 2 is a side elevation of the joint of Fig. 1, and

Fig. 3 is a cross section along lines III—III of Fig. 1.

In accordance with this invention, I have produced a joint bar that may be applied in pairs to rails to produce a relatively rigid rail joint connecting the ends of two consecutive rails, so that the joint bars will properly support the rail ends in alignment under load while permitting relatively easy accommodation of the thermal expansion and contraction of the rails with respect to one another and to the joint bars.

Referring to the figures of the drawing, there is illustrated a rail joint embodying the joint bars of the present invention. The rail 10 ending at a vertical face 12 is to be joined to another aligned rail 14 terminating in a face 16 separated from the face 12 sufficiently to allow for the expected thermal expansion and contraction of the rails with respect to one another. It is necessary that the rails be joined together so that the faces 12 and 16 will be held in longitudinal alignment with one another so that under loads from rolling stock traversing the rails, the rail ends will not be displaced horizontally or vertically with respect to each other. However, there must be provision made in the joint to permit the faces 12 and 16 to approach each other as the rails expand, or withdraw from each other as the rails contract, in accordance with changes in the temperature thereof. It is desirable that the rail joint be of such a nature that it provides a supporting girder-like structure to carry the load of rolling stock so that in effect there is no substantial break in the structural continuity of the rails at the joint with respect to load carrying capacity.

In accordance with my invention there is applied to the rails 10 and 14 two longitudinal asymmetrical joint bars 18 and 20. The joint bar 18 has an expansion loop 22 and the joint bar 20 has an expansion loop 24, each expansion loop being disposed asymmetrically of the ends of the joint bar. In effect, the expansion loops break up each joint bar into short legs 26 and 28, respectively, and long legs 30 and 32, respectively. The expansion loop while shown as being rounded may be of suitable size, shape and dimensions to meet the requirements of the particular application. Each of the short legs 26 and 28 has a number of bolt apertures 34 of a size very closely fitting bolts 36 applied thereto. The clearance between the bolts 36 and the apertures 34 is small and insufficient to accommodate thermal expansion and contraction. The bolts 36 pass through apertures in the webs 40 and 42 of rails 10 and 12, such apertures being in alignment with and of a size similar to apertures 34. The extreme ends of the longer legs 30 and 32 are also provided with bolt apertures in alignment with and conforming in size to the apertures 34. Bolts applied through these apertures 34 may be applied with as much force as is required to assure an extremely tight and relatively immovable fit of the rails and joint bars as is possible. The ends of the joint bars are intended to be rigidly affixed thereby to the rails with no relative movement occurring between each end of the joint bars 18 and 20 and the rails 10 and 14.

There are provided at least two bolt apertures 44 and 46 in each of the longer legs of the joint bars adjacent the expansion loops 22 and 24 with one of the bolt apertures being disposed on each side of the space between the faces 12 and 16 of the rails. Each of the bolt apertures 44 and 46 is much larger, at least longitudinally, than the apertures 36 in order to permit relative movement of the faces 12 and 16 of the rails with respect to the joint bars due to thermal expansion and contraction of the rails. Bolt apertures are provided in the rail webs 40 and 42 in alignment with the apertures 44 and 46. Bolts 48 and 50 are applied to the larger apertures 44 and 46 with only sufficient force to permit relative movement of the rails with respect to this portion of the joint bars.

If desired, though it is not absolutely necessary, additional bolt apertures 52 and 54 are provided in that portion of the longer legs directly opposite the center of the expansion loops 22 and 24 to permit additional bolts 56 and 58 to be applied to hold the longer legs against the rail. The heads of the bolts 56 and 58 are applied directly against the rail web while the nuts are applied against the longer leg of the respective joint bars.

As shown in Fig. 3, each of the rail joint bars 18 and 20 is provided with an upper flanged portion 60 fitting against the underside of a rail head 62 and a lower flange portion 64 fitting against a wide rail base 66. The lower flange portion 64 has a sloping face 68 fitting against the corresponding slope in the base 66 of the rail. This enables the joint bars to function more effectively in supporting the load and preventing the rail ends from separating with respect to each other. It will be understood that the shape of the flanges 60 and 64 may be varied from the precise configuration shown in Fig. 3 of the drawing. The flanges 60 and 64 are applied only to the short legs 26 and 28 and the long legs 30 and 32 of the joint bar. The expansion loops 22 and 24 would not be benefited by flanges.

When the ends of two consecutive rails are formed into a joint, as shown in Figs. 1 and 2 of the drawing, using the joint bar of the present invention, they will be enabled to expand and contract with changes in the temperature of the atmosphere without requiring the looseness of the conventional joint bar now employed. The ends of the joint bars will be rigidly fastened to the respective rails; that is, bolts 36 and 56 will be tightened as much as possible so as to prevent any relative movement between the joint bar and the rail to which it is fastened. When changes of temperature take place so that the faces 12 and 16 of the rails 10 and 14 are forced to move with respect to each other due to changes in length of the rails, the expansion loops 22 and 24 will be opened or closed depending on the direction of movement of the rail faces 12 and 16. The relatively loose bolts 48 and 50 will permit the movement of the longer leg and the portion of the expansion loop attached thereto with respect to the rail end. The expansion loop, therefore, provides a resilient member for taking up the expansion and contraction of the rails. However, at the space between faces 12 and 16, the joint bars are firmly brought up against the rail head 62 and the base 66, so that very little, if any, lateral or vertical movement of the rail ends with respect to each other can take place. Therefore, even with the variable load imposed by rolling stock passing over this gap between two consecutive rails, the joint will function more nearly as a single continuous rail by reason of the support given thereto by the relatively inflexible legs of the bars. The only freedom of motion will be that in a direction longitudinally of the rails to permit thermal expansion and contraction of the rails to be accommodated. The expansion loops 22 and 24, it should be noted, are not at the space between the rail faces 12 and 16, but at a point remote therefrom and this makes the joint more rigid.

The rail joint bars 18 and 20 may be forged of a suitable steel having characteristics enabling each expansion loop to function as a strong spring. Other methods of producing the joint bar other than forging may be employed providing the strength and resiliency of the metal will permit the joint bar to function as desired without failure.

Since certain obvious changes could be made without departing from the scope of the invention, it is intended that all matter contained in the above description shall be interpreted as illustrative and not in a limiting sense.

I claim as my invention:

A rail joint comprising two rails laid end to end, the ends of the rails having faces substantially vertical to the length of the rails, the ends of the rails being separated slightly to accommodate thermal expansion and contraction of the rails, each rail having a head, a base wider than the head, and a thin web connecting the head and the base, means for joining the ends of the two rails to restrain lateral and vertical movement and misalignment of the rails while allowing longitudinal movement of the rail ends due to such thermal change in rail length, said means comprising two longitudinally asymmetrical joint bars each joined by bolts to both of the ends of the rails meeting at the joint, each joint bar having an expansion loop asymmetrically located therein to provide a short leg on one side and a long leg on the other side of the loop, the loop of one joint bar being located along one rail at a point removed from the end face of the rail and the loop of the other joint bar being located along the other rail at a point equally removed from the end face of the said other rail, the short and long legs being provided with flange portions fitting under the head and upon the base of the rails, the flanges spanning the space separating the rails so that the long legs of the joint bars function as a girder to support the rail ends and to distribute loads applied to the rails without undue lateral or vertical movement taking place, the shorter legs having bolt apertures therein, similar bolt apertures in the rail web and corresponding apertures at the end of the long legs of each joint bar, these apertures being of such size that applied bolts will fit the apertures closely, the clearance between the bolts and these apertures being insufficient to accommodate the relative expansion and contraction of the rails with respect to the joint bars, at least two other bolt apertures in that portion of each long leg adjacent the expansion loop, one bolt aperture being on each side of the space between the rail faces, said other bolt apertures being at least longitudinally larger than the first mentioned apertures in order to allow for relative thermal expansion and contraction, bolt apertures in each rail web aligned

with said other apertures, and bolts applied through said other apertures, the expansion loops enabling the rail ends to expand and contract without the bolts applied to the ends of each joint bar being subject to or allowing movement of the joint bars to the rails.

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