A. R. HODGES.

SECTIONAL BRACING ELEMENT.

APPLICATION FILED FEB. 23, 1917.

1,249,959. Patented Dec. 11, 1917.

Fig. 1.

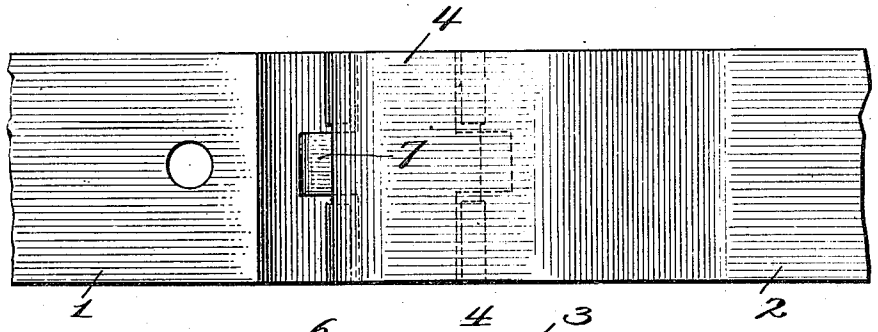


Fig. 2.

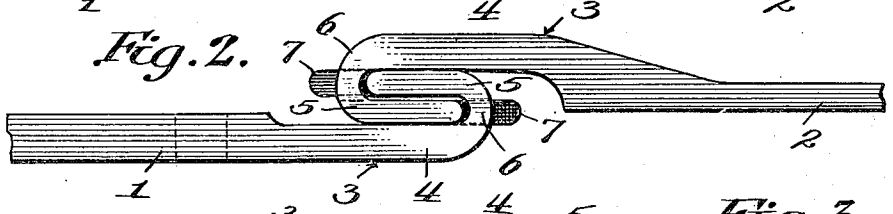
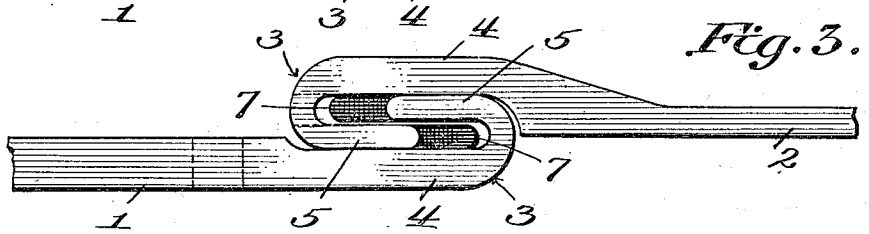


Fig. 3.



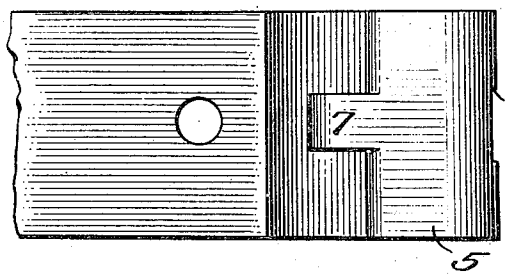
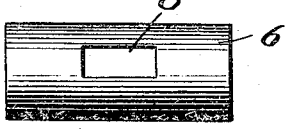


Fig. 4.

Fig. 6.



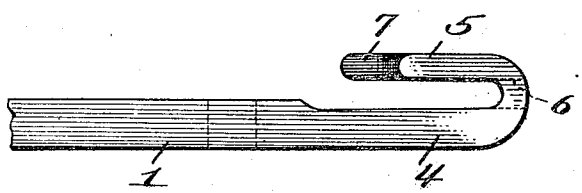


Fig. 5.

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UNITED STATES PATENT OFFICE.

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SECTIONAL BRACING ELEMENT.

1,249,959. Specification of Letters Patent. Patented Dec. 11, 1917.

Application filed February 23, 1917. Serial No. 150,517.

To all whom it may concern:

Be it known that I, ALLAN R. HODGES, a citizen of the United States, residing at Memphis, in the county of Shelby and State of Tennessee, have invented new and useful Improvements in Sectional Bracing Elements, of which the following is a specification.

This invention relates to a sectional bracing element and more particularly to an improved loose play joint for use in the connection of the parts of such an element.

Where heavy tensile or expanding stresses are encountered in mechanical structures, it is frequently necessary, and well understood to be so, to construct the affected parts of such structures whereby they will have a pronounced measure of flexibility and to organize the construction of which said parts are elements whereby their flexibility will be effectively utilized in the development of a certain capacity of expansion or stretch, while at the same time the said parts will be adequately stayed or braced against counter stresses. This is strikingly illustrated in the case of locomotive boilers where the firebox, outer shell, stay sheets or radial stays, back head braces, belly braces and various other parts are subject to the stresses incident to great heat and steam pressure and must have sufficient flexibility to render these stresses without destructive effect. It is also illustrated in load-carrying or resisting structures, for example, bridges and in various other mechanical fields.

The present invention proposes a joint as a part of a sectional bracing element which will permit a certain measure of free expansion or yield of the affected parts, and during such free expansion, the loose play of the joint is taken up, after which the sections of the bracing element pull against one another whereby said elements will resist, though not necessarily prevent, further expansion or yield of the affected parts and will stay or brace said parts during their further expansion or yield.

The principal objects of the invention are to provide a loose play joint for use as stated which shall be of exceedingly simple structural character, shall enable the sections of the bracing element to be fitted to one another accurately and with facility, which, while permitting all requisite loose play, either longitudinally, or both longitudinally and laterally, shall insure the effective pulling action of said sections against one another, which shall be of great strength, which cannot possibly be accidentally disengaged or rendered ineffective, and which may be located at any desired part of the bracing element and may be independent in its location and action of the connections or either of them between the ends of said element and the parts which said element connects.

An embodiment of the invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a plan view showing the sections of a bracing element in connected relation by means of a joint in which the features of the invention are incorporated;

Fig. 2 is a side elevation showing the improved joint in normal condition;

Fig. 3 is a side elevation showing the manner of fitting or connecting the sections of the bracing element to one another;

Figs. 4, 5 and 6 are, respectively, plan, side and end views of one of the sections of the bracing element and a member of the joint carried thereby.

Similar characters of reference designate corresponding parts throughout the several views.

The invention is shown in its application to a rod or strut for bracing the back head of a locomotive boiler as disclosed more in detail in my co-pending application Serial No. 150,510, but such disclosure is merely by way of example since the invention is applicable to bracing elements in general where it is of advantage or necessity that such elements satisfy the requirements previously set forth.

The sections of the brace are designated 1 and 2 and the improved joint comprises interengaging and interlocking parts associated with said respective sections and which are preferably similar in construction. In the embodiment disclosed and which, as now considered, is preferred, each element of the joint comprises a hook 3 having parallel or substantially parallel legs 4 and 5, and a bow 6 connecting said legs. The legs 4 are connected, integrally or otherwise, to the section of the bracing element from which they project; are in co-planar relation to said

sections or in a plane parallel or substantially parallel to extensions of the planes of said sections; and each leg 5 is provided with a co-planar or substantially co-planar reduced terminal lug 7 for which the bow of the other joint element is provided with an opening 8. The spacing of the legs 4 and 5 of each joint element is selected whereby the leg 5 of the companion joint element may have a loose, though not too loose, sliding fit between them or, stated otherwise, whereby the hooks 3 may be slidably interengaged. In normal relation the terminal lug 7 of one hook projects loosely through the opening 8 in the bow of the other hook and thereby achieves its function of limiting the transverse relative displacement of said hooks and preventing their disengagement by a relative transverse movement thereof. Where only longitudinal play of the sections 1 and 2 is required the width of the opening 8 will be only sufficient to permit free longitudinal sliding movement therein of the lug 7 but where both lateral and longitudinal play of the sections 1 and 2 are required the width of the opening 8 will be sufficient to permit the lug 7 to slide laterally or transversely through the necessary extent. As shown, the opening 8 is somewhat wider than the lug 7 whereby said lug will have a certain measure of lateral or transverse play in said opening.

Whether the leg 4 be co-planar with or offset from the section of the bracing element by which it is carried its length will be sufficient to enable the engagement of the hooks 3 in the manner shown in Figs. 3 and 2. The preferred manner of organizing the brace is, first, to move the sections 1 and 2 and with them the hooks 3 laterally relatively to one another, whereby the leg 5 and lug 7 of each hook enter and slide transversely between the legs 4 and 5 of the companion hook, this movement being continued until the lugs 7 aline with the openings 8 and then to pull the sections 1 and 2 relatively outward whereby the lugs 7 will pass through the openings 8. This manner of organizing the brace enables its parts to be fitted in relatively narrow or inaccessible spaces.

In connecting the sections 1 and 2 to the respective parts between which the brace element extends the total length of the brace element is selected to provide for the required measure of longitudinal play between the hooks 3 whereby the brace element will permit a free relative expansion or outward movement of the parts which it connects before the ends of the legs 4 contact with the bows 6 which said legs confront. During such free expansion or relative outward movement of the parts which the brace element connects the loose play of the hooks 3 is taken up whereupon the ends of the legs 4 will contact with the bows 6 and the sections of the brace element will pull against one another in the further expansion or relative outward movement of the parts which the brace element connects, thereby staying or bracing said parts and resisting their further expansion which, however, the brace element does not necessarily prevent until a limit, selected with regard to the limit of expansion or outward movement compatible with serviceability, has been reached.

The contraction or relative inward movement of the parts which are connected by the brace element is, of course, not resisted by said element and is effective to restore its sections and the hooks 3 to their normal relation wherein there is a determined measure of loose play between said hooks, as above explained.

It is to be observed that the length of the lug 7 is selected with regard to the environment of use and is, in any case, sufficient to prevent the disengagement of said lug from the opening 8 when the limit of contraction or relative inward movement of the parts connected by the brace has been reached.

Where the two parts of the joints are duplicates, as in the construction disclosed, the manufacture of the joint is greatly facilitated, as is obvious.

Further advantages in the contemplation of the invention are that the hooks may be slid transversely into engagement with one another from either side, accordingly as convenience may dictate; the location of the joint on the brace member may be selected as desired; and the joint may be located and will act independently of the connections between the ends of the brace member and the adjacent parts whereby the brace member may be stripped from the structure of which it forms a part without affecting the joint of its sections and, hence, without impairing its capacity for re-use.

While the invention has been described with reference to an embodiment which as now considered is preferred, it will be understood that structural variations may be resorted to within the legitimate scope of the invention and of the appended claims.

I claim as my invention—

1. A loose play joint for a sectional brace element comprising a pair of hooks, one to be carried by each section of said element, said hooks being engageable one with the other by a relative transverse movement and means operative upon a longitudinal inward movement of said hooks when engaged to prevent their disengagement by a relative transverse movement, said means being effective for its purpose during a certain measure of normal loose longitudinal play of said hooks relative to one another.

2. A loose play joint for a sectional brace element comprising a pair of hooks, one to

be carried by each section of said element, said hooks being engageable one with the other by a relative transverse movement and the leg of one hook which fits between the legs of the companion hook having terminal projecting means adapted by a longitudinal inward movement of said hooks when engaged to coöperate with said companion hook in preventing the disengagement of said hooks by a relative transverse movement, said means being effective for its purpose during a certain measure of normal loose longitudinal play of said hooks relative to one another.

3. A loose play joint for a sectional brace element comprising a pair of counterpart hooks, one to be carried by each section of said element, said hooks being engageable one with the other by a relative transverse movement and the leg of each hook which fits between the legs of the companion hook having a reduced terminal lug for which the bow of said companion hook is provided with an opening, said lugs being engageable through said openings by a longitudinal inward movement of said hooks when engaged and being effective through a certain range of normal loose longitudinal play to prevent the disengagement of said hooks by a relative transverse movement thereof.

4. A loose play joint for a sectional brace element comprising a pair of hooks, one to be carried by each section of said element, said hooks being engageable one with the other by a relative transverse movement and means operative upon a longitudinal inward movement of said hooks when engaged to prevent their disengagement by a relative transverse movement, said means being effective for its purpose during a certain measure of normal loose longitudinal play of said hooks relative to one another and while thus effective permitting a certain measure of loose transverse play of said hooks relative to one another.

5. A loose play joint for a sectional brace element comprising a pair of counterpart hooks, one to be carried by each section of said element, said hooks being engageable one with the other by a relative transverse movement and the leg of each hook which fits between the legs of the companion hook having a reduced terminal lug for which the bow of said companion hook is provided with an opening, said lugs being engageable through said openings by a longitudinal inward movement of said hooks when engaged and being effective through a certain range of normal loose longitudinal play to prevent the disengagement of said hooks by a relative transverse movement thereof, said openings being sufficiently wider than said lugs to permit said hooks to have a certain measure of loose transverse play relative to one another.

6. A loose play joint for a sectional brace element comprising a pair of engaged hooks adapted to slide longitudinally one on the other and means effective to permit a normal measure of loose longitudinal play of said hooks while limiting their relative transverse displacement.

7. A loose play joint for a sectional brace element comprising a pair of engaged hooks adapted to slide longitudinally one on the other and projecting terminal means carried by one hook for coöperation with the other hook to limit the relative transverse displacement of said hooks while permitting a certain normal measure of loose longitudinal play thereof.

8. A loose play joint for a sectional brace element comprising a pair of counterpart companion members adapted for interlocking engagement and for longitudinal play in such engagement, each member having a terminal lug and an opening to receive the terminal lug of the companion member, the said terminal lug being longitudinally movable in said opening and serving to limit the relative transverse displacement of said members.

9. A loose play joint for a sectional brace element comprising a pair of members adapted for interlocking engagement, said members having their interlocking engagement established by an initial transverse sliding movement and by a subsequent longitudinal sliding movement relative to one another, said joint having means operative in the engaged relation of said members for permitting longitudinal play thereof in such engaged relation and for limiting their transverse play.

10. A loose play joint for a sectional brace element comprising a pair of members adapted for interlocking engagement, said members having their interlocking engagement established by an initial transverse sliding movement and by a subsequent longitudinal sliding movement relative to one another, one of the members having a projecting lug and the other member having an opening through which said lug projects in the engaged relation of said members, said lug when projecting through said opening permitting longitudinal play of said members in their engaged relation and limiting their transverse play.

11. A loose play joint for a sectional brace element comprising a pair of members adapted for interlocking engagement and freely detachable from one another by movements in prescribed directions, and means having its elements associated with the respective members and operative in the interlockingly engaged relation of said members for limiting their relative transverse displacement while permitting a certain measure of longitudinal loose play.

12. A loose play joint for a sectional brace element comprising a pair of hook members adapted to be engaged one with the other, the outer leg of each hook member fitting, in the engaged relation of the members, between the legs of the companion hook member, and a lug carried by one of the hook members, the other hook member having an opening in which said leg fits in the engaged relation of the members to limit their relative transverse displacement.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ALLAN R. HODGES.

Witnesses:
JOHN S. TOWERS,
JOHN L. FLETCHER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."