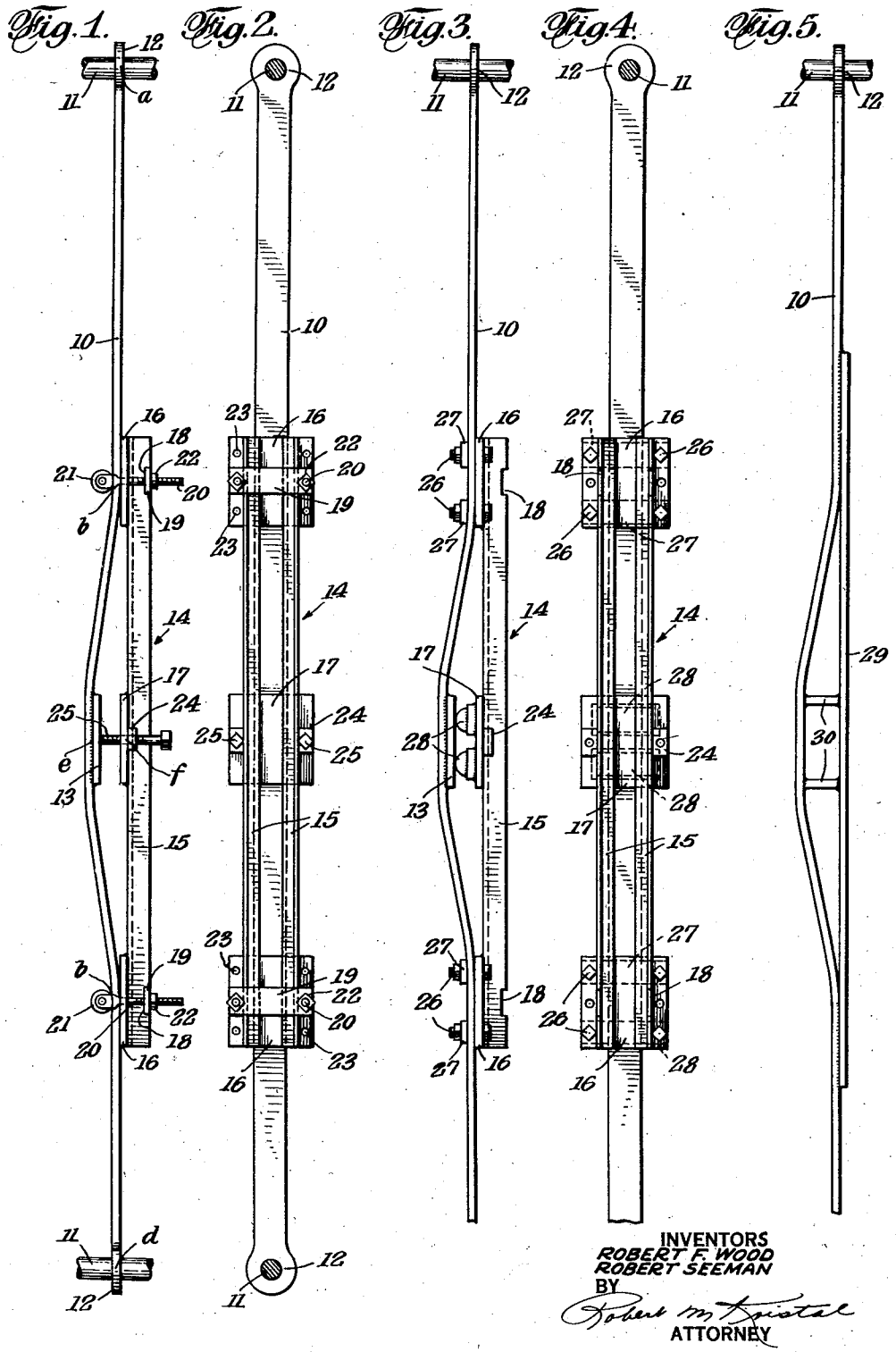
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METHOD OF ADJUSTING THE LENGTH OF STRUCTURAL MEMBERS

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METHOD OF ADJUSTING THE LENGTH OF STRUCTURAL MEMBERS

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The present invention relates to a novel method for adjusting the effective length of structural members such as eyebars.

Although constructed many years ago, old pin-connected trusses are well able to carry modern loadings insofar as the strength of the original structural sections is concerned. These trusses, however, have become unfit for further safe service by reason of the loosening of the eyebars of which they are comprised, a condition caused by wear on both the pins and the eyes of the eyebars, and of distortion caused by reversal of stress due to inefficient countering of members out of alignment. Several other causes for the loosening of the eyebars, such as bearings cutting into masonry on the truss, have been recognized.

Generally, only some of the eyebars in the panel of a truss will become loosened. If all the eyebars in a panel were loose, the top chord would be functioning as a beam under dead load—a condition which rarely occurs. Many eyebars, loose under dead load, tighten when live load comes onto the structure.

It is evident then that by adjusting the length of loose eyebars so that they take their proper proportion of the load of the truss, the useful life of the structure may be definitely prolonged.

Prior methods of adjusting eyebars, usually entailed cutting away a central portion thereof and installing means such as turn-buckles for setting up the desired stress in the eyebars.

With the above in mind, this invention contemplates a method for adjusting the effective length of eyebars wherein said eyebars are maintained intact with a middle portion thereof urged and held out of alignment with the end portions.

More specifically, the invention contemplates shortening the effective length of an eyebar to properly stress the same, by applying means for urging a middle portion of said eyebar out of alignment with the eye portions thereof and locking the eyebar in its arched offset condition as by means of yoke and spacer means.

Another feature of the invention resides in the manner in which the eyebar is fore-shortened by forcing a middle point thereof out of alignment with the eye portions and guiding intermediate portions of the eyebar so they may suitably adjust themselves.

The invention is further characterized by the speed and ease with which an eyebar may be properly stressed. After application of the fore-shortening means and proper adjustment thereof, it is only necessary to lock said means in place by bolts, or by welding and to merely remove the adjusting means and the mentioned guiding means.

The means for effecting the fore-shortening of the eyebar, preferably includes a back member positioned as a chord across the arched offset portion of the eyebar, and it is contemplated either to lock this member to the eyebar as above stated, or to replace it with a bridging chord welded into position.

With the foregoing and many other objects, features, and advantages in mind, the invention is more fully realized in the accompanying drawing which forms the basis for the following detailed specification. While the forms of the invention which are here disclosed are at present, preferred, they are intended as exemplary only since many variations thereof may well be conceived within the spirit and scope of the appended claims.

In the drawing:

Fig. 1 is an edge view of an eyebar with adjusting means, as contemplated herein, applied thereto.

Fig. 2 is a side view thereof.

Fig. 3 is a view similar to Fig. 1 showing the means of that figure locked to the eyebar to maintain it in its newly stressed condition.

Fig. 4 is a side view thereof.

Fig. 5 is an edge view of an eyebar having alternate means for maintaining it in stressed condition after application thereto of the adjusting means of Fig. 1.

Referring now to Figs. 1 and 2 of the drawing, an eyebar 10 is shown as disposed between the truss pins 11 which it connects. Long use having caused wear on the eyes 12 and the pins 11 or distortion of the eyebar, said bar no longer serves its proper function in supporting its proportional share of the load of the truss of which it forms a part. Fore-shortening the eyebar to place it under stress would restore its useful function.

To this end, a pad 13 is welded to a middle portion of the eyebar as shown and a back member generally designated 14, applied. This latter member comprises essentially a pair of spaced structural angles 15, connected at their ends as by means of the plates 16 and at their middle by a plate 17. The back member thus fabricated has great strength, commensurate with the tensile strength of the eyebar 10.

The angles 15, at both ends thereof, are preferably notched as at 18 for the clamp plates 19 transversely disposed in relation to said angles. These plates 16 serve to mount screw studs 20

formed with bearings between the respective pairs of which are carried clamp rollers 21. As shown, the plates 16 are disposed against one face of the eyebar 10 and the rollers 21 against the other face thereof, the nuts 22 serving as means for drawing said rollers tightly into position. The plates 16 are also provided with the holes 23 for reasons later apparant.

The plates 16 and 17 are preferably welded to the angles 15, the latter being provided with welded on bosses 24 so that suitably long screw seats for the eyebar stressing screws or bolts 25, are provided. These bolts are arranged to impinge upon the pad 13 carried by the eyebar.

As may be readily seen from Fig. 1, manipulation of the bolts 25 will cause the pad mounted portion of the eyebar to become dis-aligned in relation to the eyes 12. It will also be noted that stretch in the eyebar is facilitated because the portions thereof engaged by the rollers 21 may slide in relation thereto until all of the slack in the eyebar is taken up and said eyebar is under proper stress and arched in relation to the back member 14.

It has been noted in many cases, eyebars which are loose under dead weight tighten under live load and therefore function to a small degree. The maximum elongation noted does not exceed ⅝ inch. Assuming this maximum figure and considering the eyebar between the points *a* and *d* as an elastic chord, if point *f* is to be moved to *e*, the length *a*—*d* will be fore-shortened according to the formula

$$2(\sqrt{bf^2+ef^2}-bf)$$

Let $bf=60''$ and $ef=6''$

Then $2(\sqrt{60^2+6^2}-60)=2(60.3-60)=2\times.3=\frac{5}{8}''$ approximately

Thus a 6'' dis-alignment of the eyebar will cause a shortening thereof of ⅝''.

The increased stress may be stated as 60.3/60 or ½% when the chord is stressed.

If it were possible to distort the eyebar in the same manner as a chord is distorted without application of intial stress, the desired shortening could be obtained without impairment of the strength of the eyebar. The ½% increase in the stress indicates a close approximation of what occurs when an eyebar is stressed as compared with the chord in the example.

After the eyebar has been shortened as above described yoke bolts 26 (Figs. 3 and 4) are placed in the holes 23, and by means of yoke plates 27, these bolts are locked to cause said yoke plates and the respective plates 16, to grip the intermediate portions of the eyebar. The clamp plates 19, studs 20 and rollers 21, may now be removed.

Between the pad 13 in its offset position, and the plate 17, there may be inserted the spacer means 28 which are preferably welded into place. The eyebar stressing bolts 25 may now be removed. When this has been accomplished, the eyebar is maintained in its stress fore-shortened arched condition by the back member 14 which forms a chord across the arched offset portion of said eyebar.

As illustrated in Fig. 5, after the eyebar has been treated as in Fig. 1, the back 14 and all parts carried thereby and prior to the removal thereof may be replaced by a chord member 29 welded to the eyebar as shown. If desired the spacers 30 may also be incorporated into the structure.

From the foregoing it is evident that a novel and improved method for adjusting the effective length of eyebars and the like has been disclosed. It is repeated however, that the specific details of this disclosure may be varied by skilled persons within the scope of the invention as claimed.

What we claim as new and desire to obtain by Letters Patent, is:

1. A method of shortening the length of a structural member, comprising applying a back to said member extending lengthwise thereof, applying lateral pressure to an intermediate portion of the structural member intermediate the ends of said back, displacing said intermediate portion relative to the end portions thereof while guiding said end portions in sliding relation lengthwise relative to the back in response to the displacing action, and thereafter securing the end portions of the member to the end portions of the back holding the same against sliding movement relative thereto.

2. A method of shortening the length of a structural member, comprising applying a back to said member extending lengthwise thereof, embracing end portions of said member by rolling means attached to said back holding said end portions to opposite end portions of the back, applying a force transversely relative to the back against the adjacent side of the member intermediate the ends of said back displacing said intermediate portion transversely relative to the end portions thereof while said end portions of said member slide through the embracing means in response to said displacing action, thereafter securing the end portions of the member to the end portions of the back holding the same against sliding movement relative thereto, and holding said intermediate portion of the member in its laterally displaced relation.

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