Dec. 7, 1926. 1,609,699

W. C. CORYELL.

JOIST BRACE

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Fig. 1.

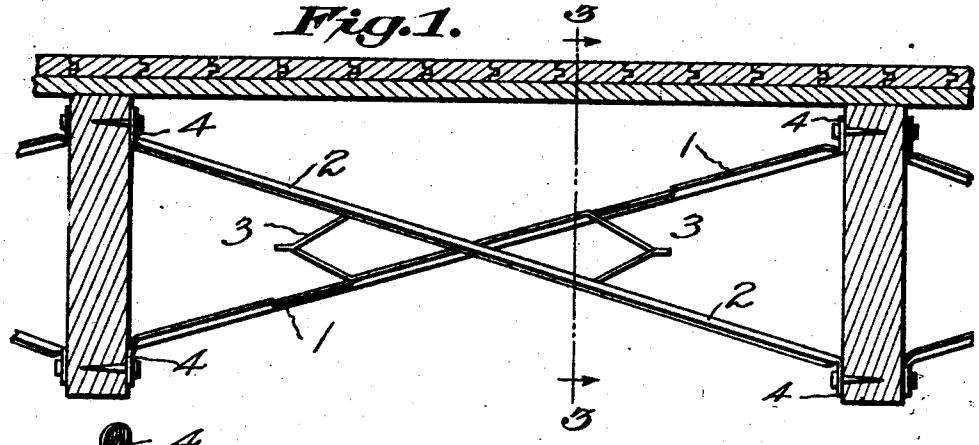


Fig. 2.

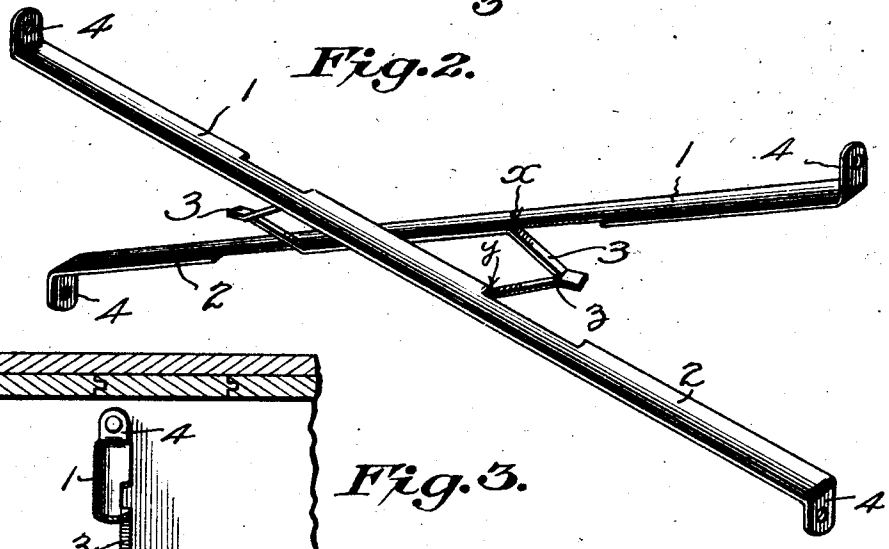


Fig. 3.

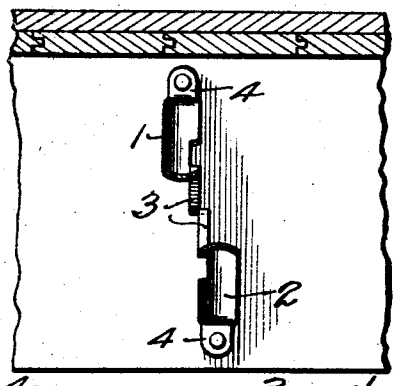
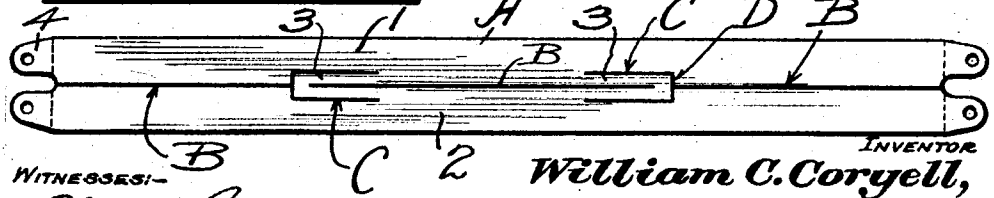


Fig. 4.



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JOIST BRACE

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Fig. 5.

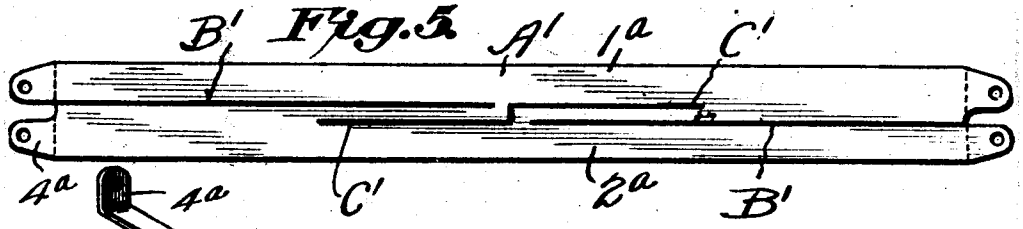


Fig. 6.

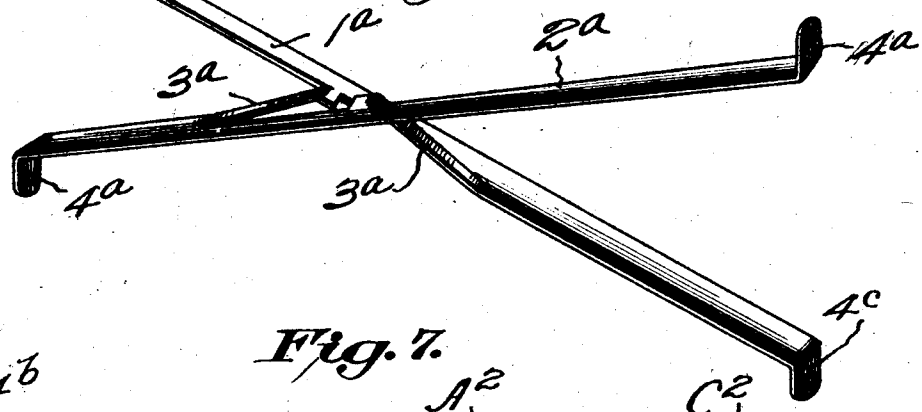


Fig. 7.

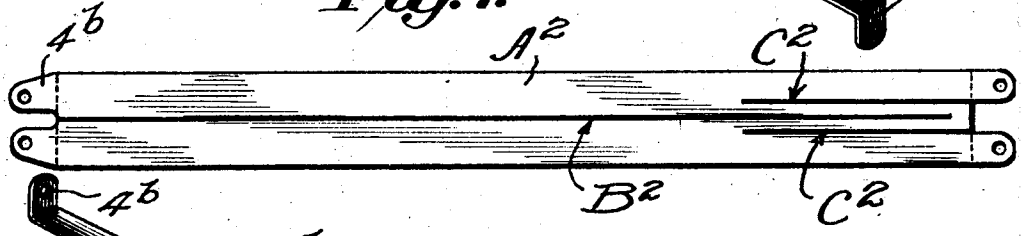
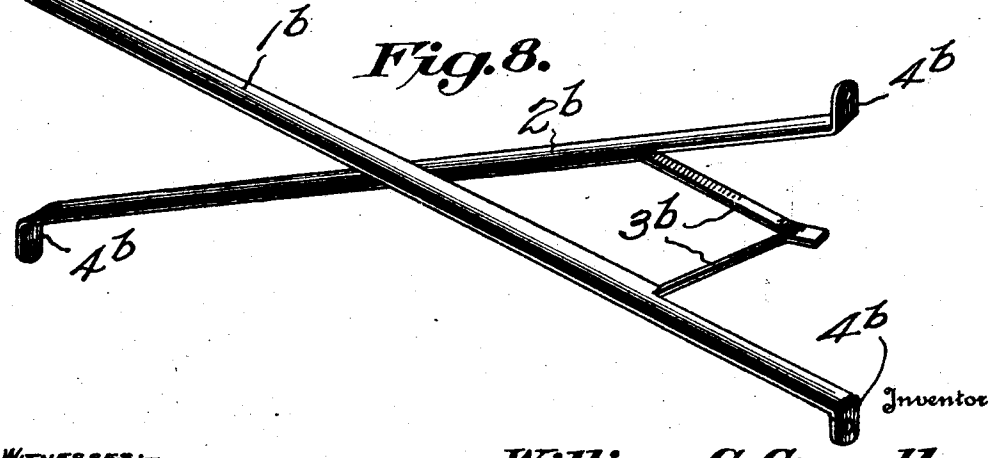


Fig. 8.



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JOIST BRACE

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Fig. 9.

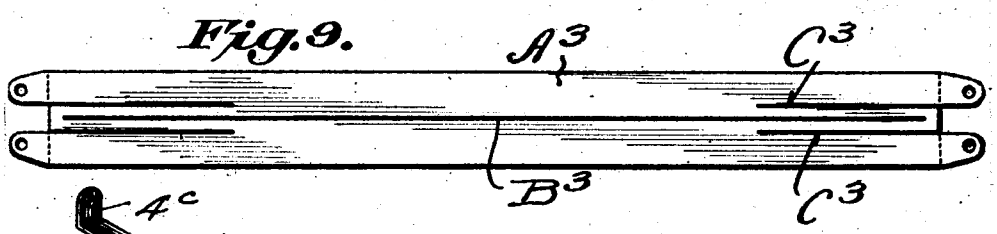


Fig. 10.

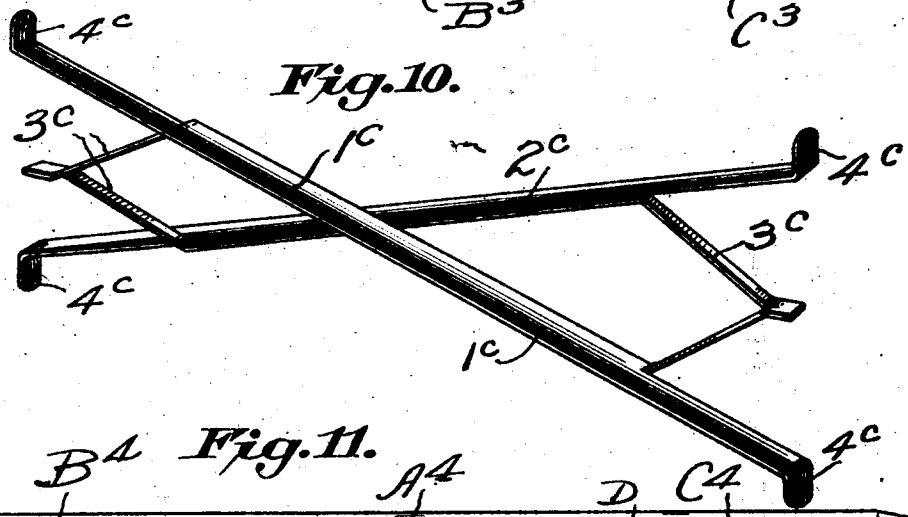


Fig. 11.

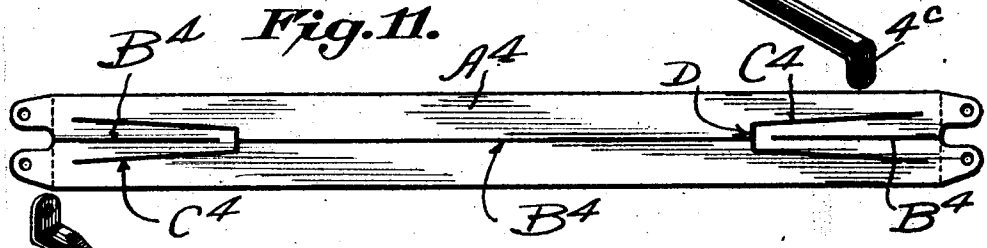
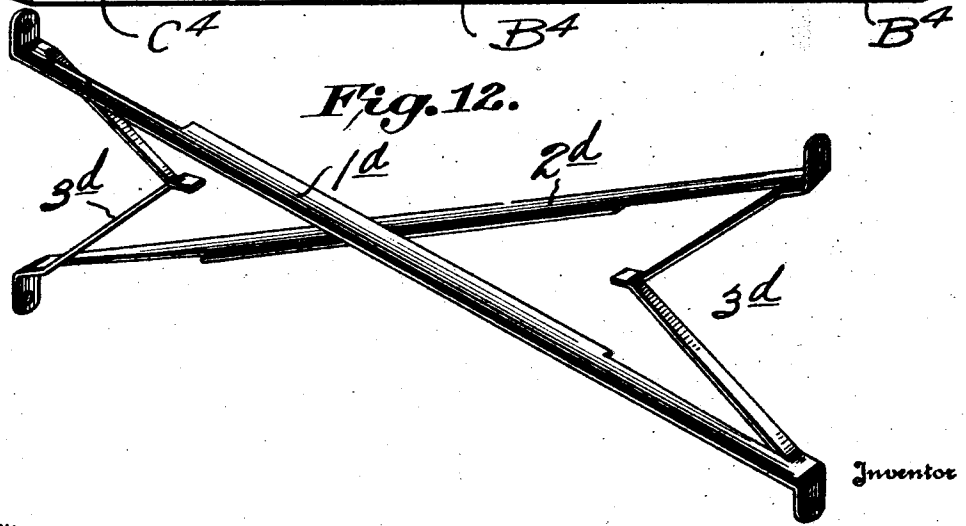


Fig. 12.



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UNITED STATES PATENT OFFICE.

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JOIST BRACE.

Application filed May 28, 1925. Serial No. 33,532.

This invention relates to a novel and practical improvement in joist braces or bridging for holding floor joists in proper spaced relation and also reinforcing the floor construction.

In its general aspect the present invention contemplates a brace that will effect considerable economy in the quantity of blank stock used, thereby not only enhancing the invention from a commercial standpoint but also providing a lighter brace whose strength and rigidity remain unimpaired.

Another object of the invention is to provide a joist brace including brace members connected by an integral tie piece, and formed from a single blank, and in which the tie piece has sufficient flexibility within itself to permit some horizontal freedom as well as vertical freedom of movement in the two crossing brace members. This feature has the advantage of permitting a wider range of selection of the points of attachment for the ends of the brace members thereby to adequately provide for varying conditions of installation, such for example as when the joists are warped or slightly out of position, or when it is desired to have one member of the brace occupy relatively oblique position with reference to the other, or when the point of attachment is unsuitable for receiving the fastening for securing the brace in position. An instance of the latter is where, in connection with wooden joists, a knot hole or other defect exists.

A further object of the invention is to provide a brace of the character set forth which may be formed with one or more tie pieces located away from the center or crossing point of the brace members, thereby materially contributing to the strength of the brace at the center, where it properly should be the strongest. In that connection the present type of brace leaves it possible to obtain a maximum radius of gyration for a certain distance along the center, which in turn will permit the maximum strength to be obtained as a column.

With the above and other objects in view which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

A preferred and practical embodiment of the invention is shown in the accompanying drawings in which—

Figure 1 is a view illustrating the application of the invention.

Figure 2 is a perspective view of the improved joist brace shown in Fig. 1.

Figure 3 is a vertical sectional view taken on the line 3—3 of Fig. 1.

Figure 4 is a plan view of a slitted blank from which the brace of Fig. 2 is made.

Figure 5 is a plan view of a modified form of slitted blank.

Figure 6 is a perspective view of the brace formed from the blank shown in Fig. 5.

Figure 7 is a plan view of a further modified form of blank.

Figure 8 is a perspective view of the brace formed from the blank shown in Figure 7, wherein only one tie piece is used between the point of crossing of the brace members and the ends thereof.

Figures 9 and 11 are plan views showing further modified forms of slitted blanks.

Figures 10 and 12 are perspective views of the joist braces made respectively from the blanks shown in Figures 9 and 11.

Similar reference characters designate corresponding parts throughout the several figures of the drawings.

As previously indicated it is one of the objects of the present invention to provide a brace adapted for use in connection with joist, studding or other building elements which is not only lighter; provides a wider range of manipulation and adjustment in installing; but also provides a stronger construction since the location and arrangement of the tie piece avoids weakening at the center, thereby preventing any tendency of the brace members to buckle or bend at this point. Also the present type of brace provides the necessary clearances to permit of, and facilitate, the installation of plumbing, wiring, gas pipes, etc.

Accordingly, with the above considerations in view the present invention provides a joist brace which may be formed from blank sheet metal stock-material of suitable gauge and designated generally as A in Figure 4. This blank A is formed with a plurality of longitudinally disposed slits B and C which are located out of alinement, or disalined, and arranged in suitably

spaced relation while the slits C may be united by a relatively short transverse slit D, thereby to form the bar-like brace members 1 and 2 and the connecting tongues or tie-pieces 3. The slits B which define the inner sides of the members 1 and 2 are located substantially at the center or central portion of the blank A and may be continuous or discontinuous, and the relatively short slits C which are usually arranged parallel with the slits B are located between the said latter slits and the outer edges of the brace members 1 and 2. The ends of the members 1 and 2 are preferably formed with the perforated attaching ears 4 which may be bent into offset relation as shown in Figures 1 and 2 thereby to facilitate the attachment of the brace to the joist or other structural building element.

As will be observed from Figures 1 to 4 inclusive the effect of the novel slitting of the blank A is to form the brace members 1 and 2 and the connecting tie-pieces 3 from a single metal blank whereby the said members 1 and 2 are integral with the relatively narrow bendable tie-pieces 3. Also, the tie-pieces 3 are relatively long and lie in a plane parallel to the plane of movement which brings the brace members 1 and 2 into crossing relation. Therefore, in this construction the axes of the tie-pieces 3 lie in a plane substantially parallel to the brace members 1 and 2 as distinguished from a tie piece whose axis occupies a relatively transverse position with respect to the brace members, and has the advantage of permitting the location of the tie pieces away from the center of the brace. Furthermore, by reason of the relatively narrow and elongated characteristic of the tongues or tie pieces 3, it is not only possible to move the brace members 1 and 2 in a vertical plane parallel to their inside cut edges but also to permit of the said members being separated laterally, within reasonable limits, thereby to permit of the separation of the brace members in planes at right angles to each other.

The function of the tie pieces 3 is to hold the members 1 and 2 in assembled relation during shipping and handling preliminary to installation at the point of use, and to hold the two braces together as a pair and therefore these members need be no stronger than necessary to serve as a connector or tie piece for these members until they are ready to be put in service. By making the tongues 3 which constitute the tie pieces relatively narrow and parallel with the members 1 and 2 a plurality of bending points are provided, thereby avoiding the focusing of all of the bending strain at one point as in the case of brace members connected by a single intermediate web. That is to say, the bending of the tie pieces 3 is distributed to the points x, y and z (Fig. 2) and in view of the relative narrowness of these tongues the bending is not necessarily confined to axes located in the original flat plane of the blank, but may also manifest itself in axes located at right angles to said plane thereby to permit of the relative lateral separation of the members for the purpose heretofore indicated.

From the foregoing it will be apparent that the distinctive feature of the present invention resides in the provision of a connecting tongue or tie piece located at one side of the point of crossing of the brace member, that is between the point of crossing and the ends of the members, or near an end thereof. And, by way of illustrating the range of modification in which this feature of the invention may find embodiment, reference may be had to Figs. 5 to 12 inclusive of the drawings which illustrate examples of several of the different forms of embodiment.

In Figures 5 and 6 the brace members 1^a and 2^a are formed from the blank A′ having the disalined longitudinal slits B′ and C′ which form the tie pieces 3^a. In this embodiment the brace members 1^a and 2^a may be provided with the attaching feet 4^a as indicated.

Figures 7 and 8 show a brace comprising the members 1^b and 2^b formed from a blank A^2 having the longitudinally disposed disalined slits B^2 and C^2 and the attaching end portions 4^b. In this arrangement the single connecting tie piece 3 is located near the ends of the brace members, and has the advantage of permitting the brace members to cross at any selected point between their ends.

Figures 9 and 10 show a device including the brace members 1^c and 2^c formed from a blank A^3 by the disalined longitudinal slits B^3 and C^3 thereby to form the connecting tie pieces 3^c. This construction is substantially the formation shown in Figures 7 and 8 but with the tie pieces 3^c located near the offset attaching ends 4^c at both ends of the brace members.

Figures 11 and 12 illustrate a further modification of the construction involving the location of the tie pieces 3^d near both ends of the brace members 1^d and 2^d. The tie pieces and brace members in this instance are formed from the blank A^4 of Figure 11 by the disalined longitudinal slits B^4 and C^4 and the transverse slits D^4. The relatively short slits C^4 in this form of the invention are somewhat obliquely disposed but nevertheless retain the characteristic of lying between the relatively long longitudinal slit B^4, and the outer edge of the brace members.

Without further description it is thought that the many features and advantages of

the invention will be readily apparent to those skilled in the art and it will of course be understood that changes in the form, proportion and minor details of construction, may be resorted to without departing from the spirit of the invention or scope of the appended claims.

I claim:

1. A joist brace including brace members adapted to be brought into crossing relation, and a tie piece uniting said members between the point of crossing and the ends thereof.

2. A joist brace including brace members adapted to be brought into crossing relation and an integral tie piece uniting said members between the point of crossing and the ends thereof.

3. A joist brace including brace members adapted to be brought into crossing relation, and an integral tie piece presenting a plurality of bending points and located between the point of crossing of said members and the ends thereof.

4. A joist brace including brace members, and an integral tie piece connecting said members, said tie piece consisting of a relatively thin metal tongue located between the transverse center and the end of said members adapted to be bent to permit the brace members to be swung in crossing relation or separated laterally.

5. A joist brace including two elongated members which cross at their mid portions, and a tie-piece connecting said members between the point of crossing and the ends, said members and tie-pieces being formed from a metal blank having disalined slits formed between and substantially parallel with the outer sides of said members.

6. A joist brace including a pair of brace members crossing at their mid portions, and a tie-piece connecting said members between the point of crossing and the ends, said members and tie-piece being formed from a blank having relatively long slits and shorter slits arranged between said long slits and the side edges of said members.

7. A joist brace formed from a single blank of sheet metal and having a plurality of longitudinally disposed and disalined slits, and elongated brace members and a connecting tie-piece formed by said slits, the said tie-piece being located between the transverse center and the ends of said brace members.

8. A brace including separable brace members formed from a common blank by partially longitudinally slitting the same and provided with terminal attaching means at their ends, said brace members being adapted to be twisted into crossing relation, and a tie-piece connecting said members near one end.

9. A brace including separable brace members formed from a common blank by partially longitudinally slitting the same and provided with terminal attaching means at their ends, said brace members being adapted to be twisted into crossing relation, and a pair of tie-pieces connecting said members adjacent their ends.

In testimony whereof I hereunto affix my signature.

WILLIAM C. CORYELL.