

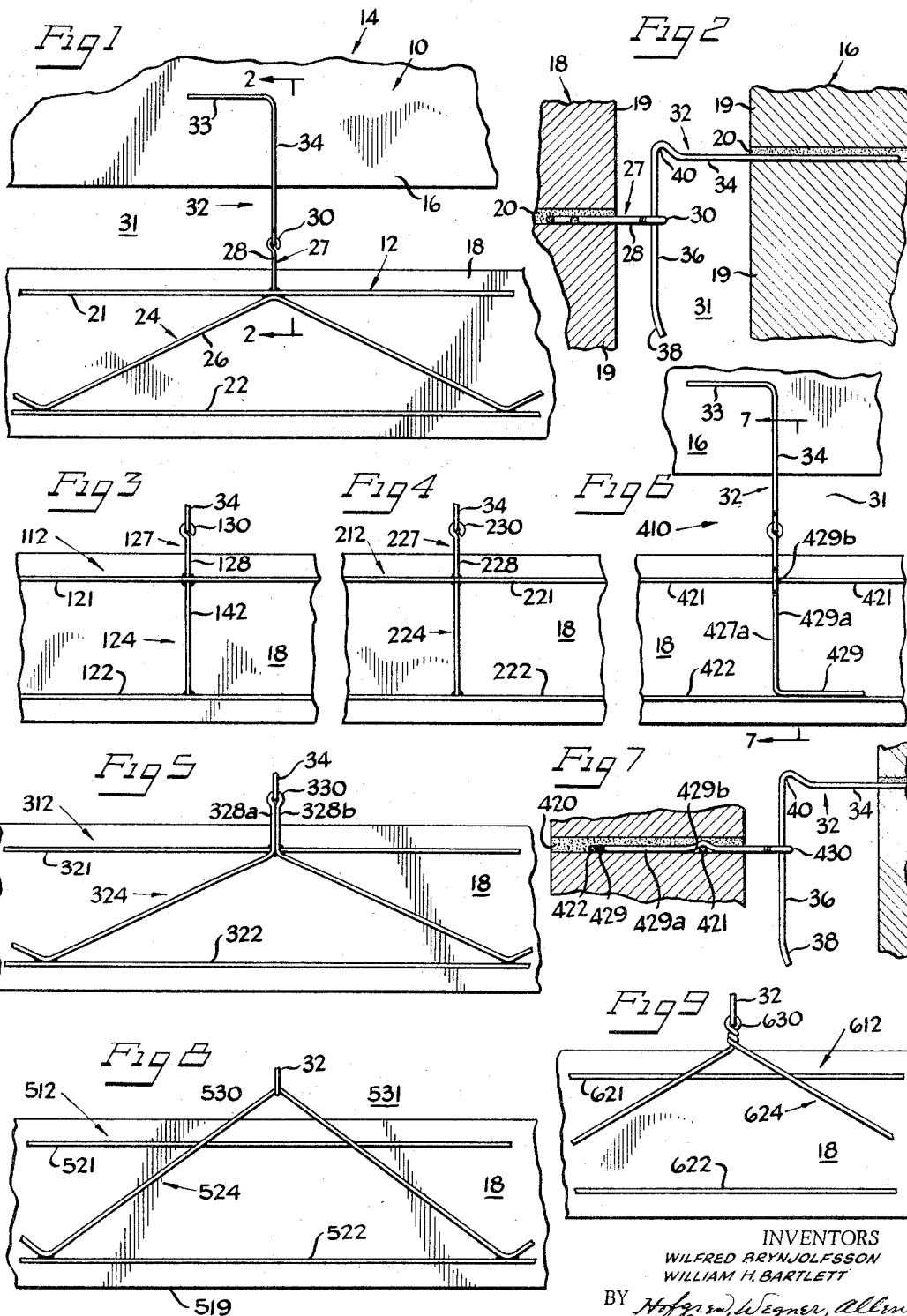
Jan. 31, 1967

W. BRYNJOLFSSON ETAL
COMBINATION ADJUSTABLE TIE AND JOINT REINFORCEMENT
FOR WALL CONSTRUCTIONS

3,300,939

Filed Oct. 17, 1963

2 Sheets-Sheet 1



INVENTORS
WILFRED BRYNJOLFSSON
WILLIAM H. BARTLETT
BY *Hoffman, Wegner, Allen,
Stellman & McCord*
ATTORNEYS

Jan. 31, 1967

W. BRYNJOLFSSON ET AL
COMBINATION ADJUSTABLE TIE AND JOINT REINFORCEMENT
FOR WALL CONSTRUCTIONS

3,300,939

Filed Oct. 17, 1963

2 Sheets-Sheet 2

Fig 10

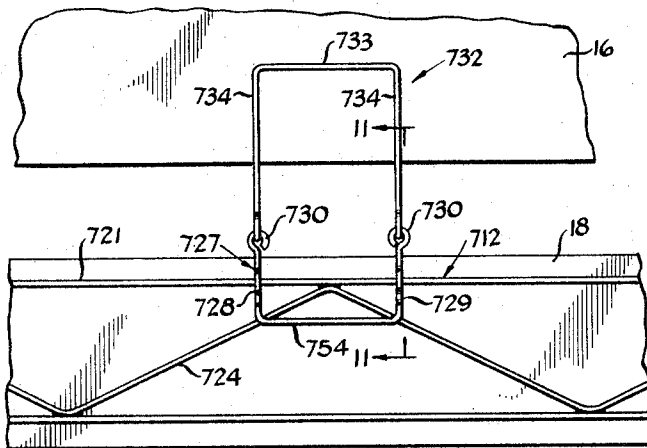


Fig 11

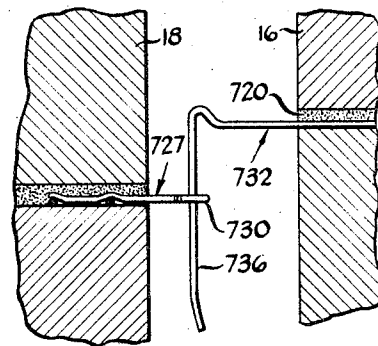
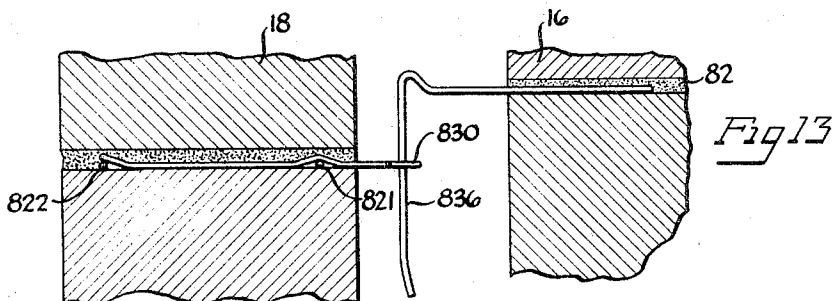
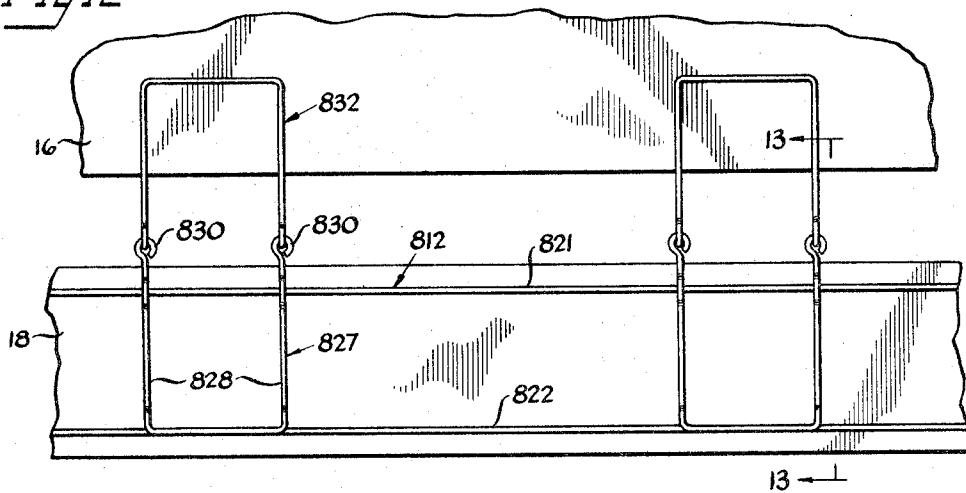


Fig 12



1

3,300,939

COMBINATION ADJUSTABLE TIE AND JOINT REINFORCEMENT FOR WALL CONSTRUCTIONS
Wilfred Brynjolfsson and William H. Bartlett, Cedar Rapids, Iowa, assignors to Dur-O-Wal National, Inc., a corporation of Iowa

Filed Oct. 17, 1963, Ser. No. 316,990

4 Claims. (Cl. 52-713)

This application relates to building construction and more particularly to a wall tie for use with joint reinforcements used in masonry wall constructions.

Joint reinforcements are frequently used between each horizontal or selected spaced horizontal layers of walls fabricated of premolded units such as concrete blocks or the like and held together by mortar joints or similar cementing substances to minimize wall cracking. A typical form of such a joint reinforcement is shown in the patent to H. L. Spaight, 2,300,181, issued October 27, 1942. The joint reinforcement disclosed therein consists of a pair of generally parallel rods tied together as a unit by cross members, the cross members preferably being V-shaped truss-like members.

Joint reinforcements may also be used as wall ties for tying together the two parallel spaced wythes of a cavity wall. However, in order to perform this function it is necessary that the courses of the two related wythes be horizontally aligned so that the rigid planar joint reinforcement can be substantially seated in the mortar of the related wythes. A relatively great deal of time and expense may be involved in attempting to construct the related wythes so that they will be horizontally aligned. Thus it would be desirable to provide a joint reinforcement adapted to serve as an adjustable wall tie so as to eliminate the need for separate wall ties and permit the joint reinforcement to be used in cavity walls having horizontally misaligned wythes.

It is therefore a primary object of this invention to provide a new and improved joint reinforcement.

It is another object of this invention to provide a new and improved adjustable joint reinforcement wall tie wherein one tie element is connected to the reinforcing member and adapted to extend into the cavity between two related wall wythes and connect with a cooperating tie element installed in the related wall wythe to secure the two wythes together as a cavity wall.

It is still another object of this invention to provide a new and improved joint reinforcement wall tie having an integral female member adapted to extend from one wall wythe and cooperate with a male tie element extending from a related wall wythe for securement thereto, the male and female elements being horizontally adjustable relative to each other and tying together two wythes having horizontally misaligned courses.

It is a further object of this invention to provide a new and improved joint reinforcement wall tie wherein the cross member of the joint reinforcement extends beyond one side of the joint reinforcement member and forms a female element for use with a male element secured in an opposed closely spaced wall wythe for cooperation with the female element to secure the two wall wythes together as a cavity wall unit.

Other objects, features and advantages of the present invention will be apparent from the following description of the preferred embodiment illustrated in the accompanying drawings, in which:

FIGURE 1 is a fragmentary top plan view of a layer of a cavity wall provided with a joint reinforcement wall tie means embodying this invention;

2

FIGURE 2 is a fragmentary vertical section of FIGURE 1;

FIGURE 3 is a fragmentary plan view of a modified form of joint reinforcement embodying this invention;

FIGURE 4 is a fragmentary plan view of another modified form of joint reinforcement embodying this invention;

FIGURE 5 is a fragmentary plan view of a further modification of a joint reinforcement of this invention;

FIGURE 6 is a fragmentary plan view of yet another modified form of joint reinforcement embodying the invention;

FIGURE 7 is a vertical section taken through the line 7-7 of FIGURE 6;

FIGURE 8 is a fragmentary top plan view of a further modification of this invention;

FIGURE 9 is a fragmentary top plan view of a modification of FIGURE 8;

FIGURE 10 is a fragmentary top plan view of still another modification of the invention;

FIGURE 11 is a fragmentary vertical section thereof taken substantially along the line 11-11 of FIGURE 10;

FIGURE 12 is a fragmentary top plan view of yet another modification of the invention; and

FIGURE 13 is a fragmentary vertical section thereof taken substantially along the line 13-13 of FIGURE 12.

In FIGURE 1, a reinforcement-tie structure 10 is shown to include a reinforcement 12 and an adjustable tie structure 27, 32. The structure 10 is arranged to secure in spaced relationship a pair of wythes 16 and 18, built up of premolded elements such as blocks 19, to form a cavity wall 14. The individual blocks 19 are laid in the wall wythes to form horizontal layers or courses set in mortar joints 20. The joint reinforcement 12 is installed in overlying relationship with selected courses and generally consists of a pair of generally parallel spaced side rods 21 and 22 formed of a strong material such as steel, the side rods being cross-connected by cross members, or wires, 24. The cross member of reinforcement 12, as shown in FIGURE 1, comprises a continuous steel element bent in a series of V's to form a series of diagonal trusses 26.

In the joint reinforcement shown in FIGURE 1, a female tie element 27, consisting of an arm of heavy wire stock 28 bent upon itself at one end to form an eye 30, is shown to be secured to one of the side rods 21, as by butt welding, near the apex of a diagonal truss 26 to extend outwardly from the rod generally transversely thereto. Thus, the female element 27 extends into cavity 31 between the two wall wythes 16 and 18.

The female tie element 27 is adapted for association with a male tie element 32 which is also formed of heavy wire stock and is generally L-shaped in plan as well as L-shaped in elevation. The male element 32 includes a base 33 and an outwardly extending arm 34 generally transverse to the base and coplanar therewith. A finger 36 is formed at the distal end of the arm 34. The finger 36 extends generally transversely to the plane of the base 33 and the arm 34 and has a turned distal tip 38 to facilitate insertion thereof through the eye 30 of the female element 27.

Thus, when the joint reinforcement is arranged in a mortar bed 20 of wythe 18 with the female tie element 27 projecting outwardly therefrom into the cavity 31, the male element, arranged in a corresponding mortar bed 20 of wythe 16, may be disposed with the finger thereof extending through the eye 30 of the female tie element. As shown in FIGURE 2, where the corresponding horizontally opposed mortar bed 20 of wythe 16 is above that of wythe 18, the male element is positioned

3

with the finger 36 thereof extending downwardly. Reversely, where the opposed mortar bed 20 of wythe 16 is below that of the wythe 18, the male element 32 is positioned with the finger thereof extending upwardly through the eye 30 of the female element. A notch 40 is formed at the juncture of the arm 34 and the finger 36 which serves as a drip guard for collecting water which may pass through the wythes.

In FIGURES 3-9, other embodiments of the invention are disclosed. In each of these modifications, the same male tie element 32 is employed. For example, in FIGURE 3, a reinforcement-tie structure generally designated 112 is shown to comprise a reinforcement generally similar to reinforcement 12, but having a perpendicular transverse cross wire 124 (142) in lieu of the diagonal wire 24 of reinforcement 12. Illustratively, the female element 127 may be butt welded to one of the side members 121 at the point of securement thereto of the cross bar 142.

In FIGURE 4, the female tie element 227 and cross member 224 are continuous and define a combination cross member 224-female tie element 227 which may be secured to the side member 221 as by welding.

FIGURE 5 illustrates a further modification of the invention wherein the reinforcement member 312 includes a metal rod 324 which extends beyond the side member 321 and is bent upon itself to form an eye 330. As shown, the rod 324 further defines two parallel juxtaposed arms 328a and 329b which continue integrally outwardly from a diagonal truss cross member portion between the side members 321-322.

FIGURES 6 and 7 illustrate another joint reinforcement-tie structure 410 wherein the female tie element 427 includes a generally L-shaped base piece 427a provided with a first portion 429 secured, as by welding to extend parallel to the side member 422, and a second portion 429a extending generally transversely between side members 421-422. Portion 429a is provided with a notch 429b receiving the underlying side member 421. The free end of the female element 427 extends beyond the side member 421 and is bent upon itself to form an eye 430.

In FIGURE 8, the diagonal cross member has a width greater than the space between the side members 521 and 522. The apex of the diagonal extends into the wall cavity 531 and thus forms an eye 530 for cooperation with the male element 32. In FIGURE 9, the diagonal truss is similar to that shown in FIGURE 8, but has the apex thereof twisted upon itself to form a reinforced eye 630 for receiving the male element 32.

Referring now to FIGURES 10 and 11, a further modified form of female tie element 727 and male tie element 732 are associated with a reinforcement 712 to secure together the wall wythes 16 and 18. The male tie element 732 is similar to male element 32 except that it includes a pair of arms 734 extending one each from the opposite ends of the base 733. The female tie element 727 includes a pair of arms 728 extending one each from the opposite ends of the base 754 and having at the distal end an eye 730 through which the male element finger portions 736 extend. The arms 728 and base 754 are secured to the reinforcement 712 as by welding, the arms 728 being secured at their mid-portions to the side rod 721 and the joined ends of the arms 728 and base 754 being secured to the cross wires 724 as best seen in FIGURE 10. As shown in FIGURE 11, the female element wires may be deformed slightly about the reinforcement wires to minimize the height of the structure for facilitated installation in the mortar between the blocks of the wythe 18.

Turning now to FIGURES 12 and 13, a further modified structure embodying the invention is shown to comprise a female element generally designated 827 and a cooperating male element generally designated 832 associated with a reinforcement 812. In this embodiment,

4

the male element 832 is substantially identical to the male element 732 of the embodiment of FIGURES 10 and 11. The female element 827 includes elongated arms 828 which extend fully between the side wires 821 and 822 of the reinforcement, thereby serving as the cross rods similar to cross rods 124 and 224 of reinforcements 112 and 212 illustrated in FIGURES 3 and 4. The arms 828 include at their distal ends eyes 830 for cooperation with the male element finger portion 836, as best seen in FIGURE 13. Further, as shown in FIGURE 13, the arms 828 may be formed slightly around the side rods 821 and 822 to minimize the overall height of the structure for facilitated installation in the wall wythe 18. Thus, in the embodiments illustrated in FIGURES 10 through 12 a cooperating tie and joint reinforcement structure is provided wherein the ties are provided in pairs in lieu of the single tie structures provided in the embodiments of FIGURES 1 through 9. Thus, a substantial increase in the strength of the tie support is provided in the latter embodiments for use where such increased support is required.

Similar elements of the different embodiments disclosed above are identified by similar reference numerals, except for the hundred prefix.

In recapitulation, the joint reinforcement-adjustable tie structure of the several above disclosed embodiments provides an improved wall forming means permitting the courses of one wythe of a cavity wall to be horizontally disaligned relative to the corresponding courses of the opposed side. At the same time at least one wall wythe may be reinforced by means of the joint reinforcement portion of the structure. Thus, improved economy and simplicity of construction of the wall is obtained providing a highly desirable advantage in the highly competitive art of block wall construction. The reinforcement-tie structures of the several above disclosed embodiments are extremely simple and economical of manufacture and may be readily installed as discussed above by substantially conventional methods, as the structures are merely installed in the mortar beds of the respective selected block courses.

While we have shown and described certain embodiments of our invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of our invention as set out in the appended claims.

What is claimed is:

1. In a joint reinforcement consisting of a pair of generally parallel spaced side members secured together as a unit by a plurality of cross members for use in a cavity wall formed of a pair of horizontally spaced wythes each having a plurality of vertically related, horizontally extending layers of premolded elements laid in a bonding material, said wall portions defining a cavity between the confronting inner surfaces thereof, means for tying said wall portions to each other, comprising: a male member having a base piece with an outwardly extending arm and a finger in the end of said arm extending generally transverse to the plane of said arm and said base piece, a plurality of V-shaped truss members positioned across said side members so that the apex thereof is disposed in the space between said wythes forming a female fastening element for cooperating with the downwardly projecting finger of a male fastening element secured in the bonding material of the opposed spaced wythes for tying the wythes together as a unit.

2. The tying means of claim 1 wherein the apex of said truss member is twisted upon itself to form a hook at the projecting end thereof for receiving said finger of said male fastening member.

3. A combination wall tie and joint reinforcement structure for use in a two-wythe wall formed of spaced parallel wythes each built up of a plurality of horizontally extending courses of preformed wall elements, com-

5

prising: a first joint reinforcement member including longitudinally extending side rods and transversely extending cross rods, said member constructed and arranged for insertion in the mortar course of a wall wythe for reinforcement thereof, said first member having a plurality of tie connecting portions extending outwardly from a side rod and having a connecting means at the outer end thereof, and arranged to be positioned exteriorly of the mortar course of the one wythe for reception of a connecting element; and a plurality of discrete second tie members each having a first portion arranged to be installed in the mortar course of the other wall wythe and a second connecting portion extending outwardly from the first portion in slidable engagement with the connecting means of the first member, whereby the first member may be embedded in a mortar course of one wythe as the preformed elements of the one wythe are bonded together and the plurality of second members may be subsequently independently connected to the connecting portions of the first member as the second wythe is built adjacent the first with said second members being embedded in a corresponding mortar course of the second wythe.

4. The combination wall tie joint reinforcement assembly of claim 3 wherein the first member connecting portion comprises a female member and the second member connecting portion comprises a male member constructed and arranged for reception in the female member.

5

10

15

20

25

6

References Cited by the Examiner

UNITED STATES PATENTS

524,531	8/1894	Prescott	52—714
779,268	1/1905	Elliott	52—428
809,231	1/1906	Thines	52—694 X
963,778	7/1910	Kosack	52—426 X
1,946,732	2/1934	Danielson	52—428
1,959,176	5/1934	Rau	52—379 X
1,998,733	4/1935	Pacific	52—563
2,089,495	8/1937	Lewis	52—713 X
2,248,348	7/1941	Hall	52—426
2,300,181	10/1942	Spaight	52—694 X
2,705,887	4/1955	Xanten	52—712 X
2,929,238	3/1960	Kaye	52—562 X

FOREIGN PATENTS

129,153	9/1948	Australia.
574,984	4/1959	Canada.
574,399	5/1959	Canada.
949,306	9/1956	Germany.
437,965	11/1935	Great Britain.
576,569	4/1946	Great Britain.

FRANK L. ABBOTT, *Primary Examiner.*

RICHARD W. COOKE, JR., *Examiner.*

M. O. WARNECKE, *Assistant Examiner.*