April 17, 1962 W. A. JENNINGS 3,030,061

ADJUSTABLE BRACE CONNECTOR UNIT

Filed Feb. 20, 1961

FIG. 1

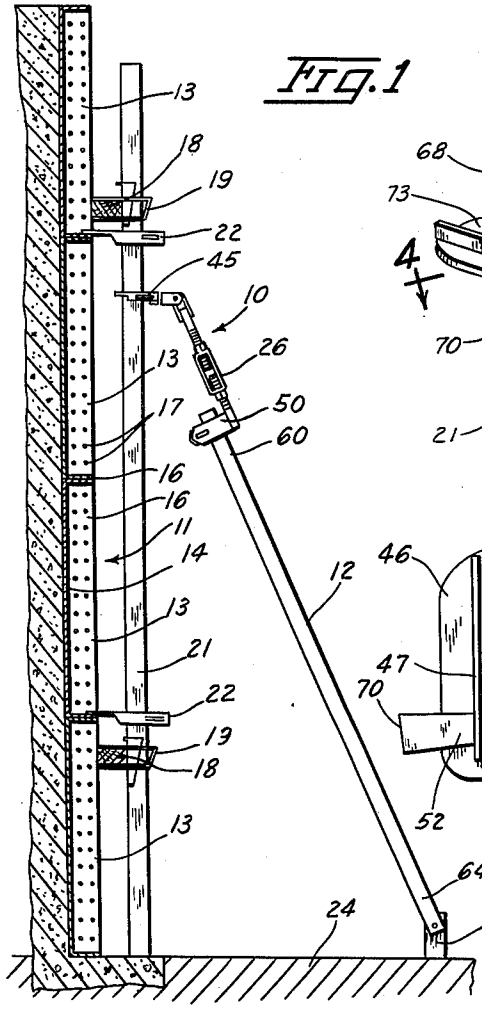


FIG. 2

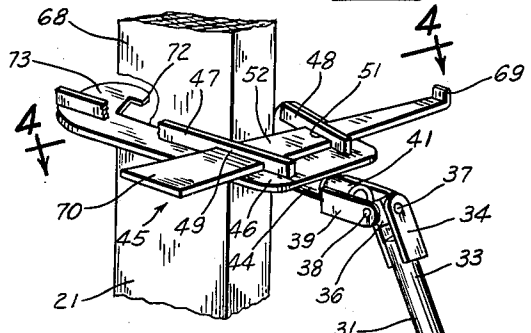
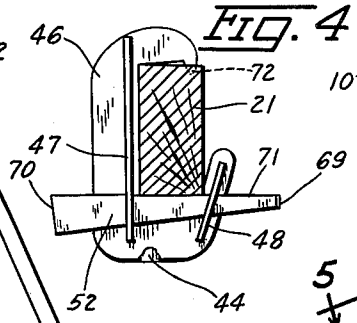


FIG. 4



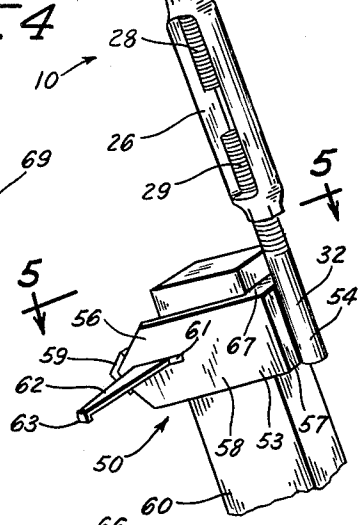


FIG. 3

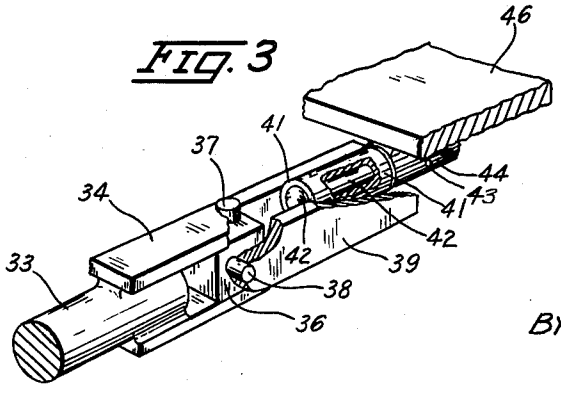
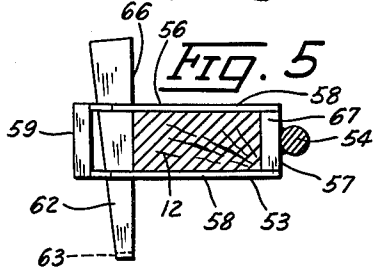


FIG. 5



INVENTOR.
WILLIAM A. JENNINGS
BY Lowell & Henderson
ATTORNEYS.

United States Patent Office

3,030,061
Patented Apr. 17, 1962

3,030,061

ADJUSTABLE BRACE CONNECTOR UNIT

William A. Jennings, Des Moines, Iowa, assignor to Economy Forms Corporation, Des Moines, Iowa, a corporation of Iowa

Filed Feb. 20, 1961, Ser. No. 90,368
6 Claims. (Cl. 248—354)

This invention relates generally to connector units and more particularly to a connector unit for brace members used in the forming of concrete structures.

In the forming of concrete structures, such as walls and the like, the usual form members are maintained in upright positions by retaining members extended across the forms and having brace members supported by posts driven into the ground at positions spaced outwardly from the forms. The lumber for such braces must be cut to the desired length and then nailed to the ground posts and the form retaining members. In many cases it is necessary to splice two or more pieces of lumber together in order to form a brace of the correct length. In any event, it is difficult to form the braces of the exact length required to extend between the forms and the ground posts. This invention, therefore, provides an adjustable connector which is usable with a form structure to provide inclined or angular braces of a desired effective length.

An object of this invention is to provide an improved connector unit.

Another object of this invention is to provide an adjustable connector unit which, when assembled with a brace for a concrete form structure, is adjustable to correct any undesired vertical inclination of the form structure.

A further object of this invention is to provide a connector unit which includes a pair of spaced clamp assemblies for connecting the unit between an upright retaining member for a form structure and a brace member whereby to form a brace of a desired length.

Yet another object of this invention is to provide an adjustable connector unit which is simple in construction, economical to manufacture, and efficient in operation.

Further objects, features and advantages of this invention will become apparent from the following description when taken in connection with the accompanying drawing wherein:

FIG. 1 is an elevational view of the connector unit of this invention, shown in assembly relation with a concrete form structure and an inclined brace member therefor;

FIG. 2 is an enlarged, perspective view of the connector unit of this invention, shown in assembly relation with a retaining member and a brace member;

FIG. 3 is an enlarged, detail perspective view of a part of the connector unit, with certain parts broken away and others shown in section for clarity of illustration;

FIG. 4 is an enlarged sectional view taken along the line 4—4 in FIG. 2 and showing one connecting member in plan view; and

FIG. 5 is an enlarged sectional view taken along the line 5—5 in FIG. 2 and showing the other connecting member in plan view.

With reference to the drawing, a connector unit of this invention, indicated generally at 10, is shown in FIG. 1 in assembly relation with a form structure 11 and a brace member 12. The form structure 11 is of the type comprised of a series of individual metal form members 13 each of which has a base portion 14 provided with a peripheral laterally extended wall or rim 16 formed with rows of spaced openings 17. The forms 13 are

held together in a usual manner by the provision of locking devices (not shown) which coact with the openings 17 to connect adjacent walls 16 when the forms 13 are arranged in tiers in a side-by-side relation. Horizontally disposed beams 18 are provided for supporting the form members 13 and are connected thereto as by clamping units 19. The brace member 12 extends between an upright retaining member 21, secured to the forms by other clamping units 22, and a post 23 driven into the ground 24 at a position spaced from the form structure 11 to maintain the form structure in an upright position.

The connector unit 10 includes a turnbuckle in the form of a link 26 (FIG. 2) the ends of which are threaded onto the threaded ends 28 and 29 of a pair of axially aligned rods 31 and 32, respectively. At the other end 33 of the rod 31, a bifurcated section 34 is formed by a pair of parallel, flat plates secured in spaced relation, as by welding, to the rod end 33. A pivot block 36 (FIG. 3) is inserted between the plates of the bifurcated section 34 for pivoting about a first pair of pivots 37, and includes a second pair of pivots 38 having an axis perpendicular to the axis of the pivots 37. A second bifurcated section 39, formed by another pair of parallel, flat plates, is pivotally connected at one end to the pivots 38, and includes a sleeve 41 at the other end through which a pin 42 is rotatably inserted. The axis of the pin 42 is normal to the axes of the pivots 37 and 38. The end of the pin 42 opposite the head is inserted into a socket 44 which is secured, as by welding, to one side of a connecting member 46. A locking pin 43 (FIG. 3) is inserted through the socket 44 and the pin 42 for securement.

The connecting member 46 (FIGS. 2 and 4) is flat and C-shaped, and is a part of an upper clamp assembly 45 (FIGS. 1 and 2) for clamping about the retaining member 21. A pair of bars 47 and 48 are secured in spaced relation to the side of the member 46 opposite the side to which the socket 44 is secured. Aligned cutouts 49 and 51, respectively, are formed in the bars 47 and 48 so as to form a slot between the bars and the connecting member through which a wedge 52 is reciprocally movable. The wedge 52 is flat and tapered, and is provided with a projection or stop 69 at its narrow end which coacts with the wider end 70 to prevent the wedge 52 from slipping out of the slots after assembly.

In assembling the connector unit 10 to the upper end 60 of the brace member 12, usually a 2" x 4" member, a lower clamp assembly 50 is provided which includes a connecting member 53 secured to the end 54 (FIG. 2) of the lower rod 32. The connecting member 53 has a U-shaped body member 56 (FIG. 5) formed with a base portion 57, to which the end 54 of the rod 32 is secured, and a pair of parallel spaced leg portions 58. An angle member 59 secured to and extended between the free ends of the leg portions 58 maintains the leg portions 58 against relative movement. Each leg portion 58 is formed with an elongated narrow slot 61 extended in a direction parallel to the leg portions 58 and at positions adjacent their terminal ends. Received in the slots 61 is a flat tapered wedge member 62 having a lateral projection 63 at one end which functions as a stop to prevent the wedge member 62 from being withdrawn from the slots 61.

In use, the lower end 64 (FIG. 1) of the brace member 12 is nailed to the post 23. With the wedge 62 of the lower clamp assembly 50 withdrawn relative to the body member 56, so that the lateral projection 63 is against the adjacent leg portion 58, the upper end 60 of the brace member 12 is extended through the body member 56 between the leg portions 58 (FIG. 2). The wedge 62 is advanced so that the side 66 (FIG. 5) thereof moves the brace member 12 against a pair of inwardly directed

flanges or projections 67 (FIG. 5), only one showing, on the base portion 57. On such movement of the wedge 62, both the side 66 of the wedge 62 and the projections 67 bite into opposite side portions of the brace member 12. By virtue of this three-point bite, the brace member 12 is positively clamped between the wedge 62 and the base portion 57 so that the end 60 of the brace member 12 is effectively clamped to the lower or one end of the connector unit 10.

The connector unit 10 is then adjusted by manipulation of the C-shaped connecting member 46 so that it is in a position to be placed about the upper end 68 of the retaining member 21. Advantageously, the manipulation is of a twofold nature. First, by rotation of the link 26, the spacing between the rods 31 and 32 is varied whereby to vary the distance between the connecting member 46 and the upper end 60 of the brace member 12. Secondly, the combination of the pivot block 36 with its two pairs of pivots 37 and 38, taken with the rotating pin 42, enables the upper connecting member 46 to be pivoted and rotated about three different axes. Thus it is apparent that the connecting member 46 can be pivoted in one direction above the pivots 37, in another direction about the pivots 38, and can be rotated simultaneously with such bi-directional pivoting in yet a third direction about the pin 42.

With the wedge 52 withdrawn until a stop 69 at one end thereof contacts an adjacent strap 48, the C-shaped connecting member 46 (FIG. 4), is located so as to receive the upper end 68 of the retaining member 21 in the C-opening formed by the connecting member 46. The wedge 52 is then advanced so that its side 71 moves the retaining member 21 against a sharp projection 72 formed on one end 73 of the connecting member 46. Thus, on such movement of the wedge 52, both the side 71 of the wedge and the projection 72 bite into the opposite side portions of the retaining member 21. By virtue of this bite, the retaining member 21 is positively clamped between the wedge 52 and the connecting member 46 so that the upper end 68 of the retaining member 21 is effectively connected to the upper end of the connector unit 10.

In summation, the upright retaining member 21 for leveling and stabilizing the form structure 11 can readily be laterally braced by an inclined brace member 12 by the use of an easily adjustable connector unit 10 connected between the retaining member 21 and the brace member 12; wherein the connector unit 10 includes relatively movable connecting members 46 and 53 for clamping the retaining member 21 and the brace member 12 in spaced relation, and includes further structure whereby one of the connecting members is capable of tri-directional movement through multiple planes.

Although the invention has been described with respect to a preferred embodiment thereof, it is to be understood that it is not to be so limited, since changes can be made therein which are within the full intended scope of this invention as defined by the appended claims.

I claim:

1. An adjustable brace connector for supporting concrete forms by varying the distance between an upright retaining member for the forms and a ground-supported brace member comprising, turnbuckle means including a pair of relatively axially movable rods, universal joint means pivotally connected to an end of one of said rods, pin means rotatably connected to said universal joint means, and a pair of clamping means adapted to be connected, respectively, to said retaining member and said brace member, one of said pair of clamping means secured to an end of the other of said rods, and the other of said pair of clamping means secured to said pin means for tri-directional movement through multiple planes.

2. An adjustable brace connector for supporting concrete forms by varying the distance between an upright retaining member for the forms and a ground-supported brace member comprising, turnbuckle means including a pair of relatively axially movable rods, universal joint means pivotally connected to an end of one of said rods and including a bifurcated section, a sleeve secured to said bifurcated section, a pin rotatably inserted in said sleeve and having an exposed threaded end, a socket threaded onto said threaded end, first clamping means secured to said socket and capable of tri-directional movement through multiple planes, said first clamping means adapted to be clamped to said retaining member, and second clamping means secured to an end of the other of said rods and connectable with said brace member.

3. An adjustable brace connector for supporting concrete forms by varying the distance between an upright retaining member for the forms and a ground-supported brace member comprising, turnbuckle means including a pair of relatively axially movable rods, universal joint means pivotally connected to an end of one of said rods, means rotatably connected to said universal joint means, and a pair of clamping means connectable, respectively, to said retaining member and said brace member, one of said pair of clamping means secured to an end of the other of said rods, the other of said pair of clamping means secured to said rotatable means for tri-directional movement through multiple planes, said other clamping means including a C-shaped connecting member forming an opening for the retaining member and having a flat side, a pair of elements having cutouts formed therein mounted in spaced relation on said flat side to form oppositely disposed slots, and a flat tapered wedge movably inserted through said slots and engageable with said retaining member.

4. An adjustable brace connector for supporting concrete forms by varying the distance between an upright retaining member for the forms and a ground-supported brace member comprising, turnbuckle means including a pair of relatively axially movable rods, universal joint means pivotally connected to an end of one of said rods, means rotatably connected to said univeral joint means, and a pair of clamping means connectable, respectively, to said retaining member and to said brace member, one of said pair of clamping means secured to an end of the other of said rods said one clamping means including a U-shaped connecting member having a substantially flat base section, a pair of slotted leg sections held in spaced relationship by said base section, and a flat tapered wedge inserted through said slotted leg sections for movement in a plane parallel to said base section, the other of said pair of clamping means secured to said rotatable means for tri-directional movement through multiple planes, said other clamping means including a C-shaped connecting member forming an opening for the retaining member and having a flat side, a pair of elements having cutouts formed therein mounted in spaced relation on said flat side whereby to form a slot therebetween, and a flat tapered wedge movably inserted through the slot and capable upon movement to diminish the opening.

5. An adjustable brace connector for supporting concrete forms by varying the distance between an upright retaining member for the forms and a ground-supported, inclined brace member comprising, turnbuckle means including a pair of relatively axially movable rods, block means pivotally connected to one of said rods for pivotal movement about a first axis, bifurcated means pivotally connected to said block means for pivotal movement about a second axis normal to said first axis, pivot pin means rotatably attached to said bifurcated means for rotation about a third axis normal to both said first and second axes, first clamping means secured to said pivot pin means and including a connecting member and a movable wedge for clamping said retaining member therebetween, and second clamping means secured to the other of said rods and including a connecting member and a movable wedge for clamping said brace member therebetween.

6. An adjustable brace connector for supporting con-

crete forms by varying the distance between an upright retaining member for the forms and an inclined brace member comprising, turnbuckle means including a pair of spaced axially movable rods, a bifurcated section secured to the free end of one of said rods, a connecting block pivotally mounted on said bifurcated section about a first axis perpendicular to the shaft, said connecting block having pivot means on a second axis normal to said first axis, and first and second connecting members detachably clamped to said retaining member and brace member, respectively, said first connecting member being of a C-shaped configuration to form an opening for receiving said retaining member, a pair of elements having cutouts formed therein mounted on said first connecting member and forming a slot, a wedge movably inserted through said slot for gradually diminishing said opening, a pin secured to said first connecting member and rotatably connected to said connecting block whereby said first connecting member is capable of tri-directional movement through multiple planes, said second connecting member being of a U-shaped configuration and having a substantially flat base section, a pair of slotted leg sections held in spaced relationship by said base section, and a wedge inserted through said slotted leg sections for movement in a plane parallel to said base section, said second connecting member secured at said base section to the free end of the other of said rods.

References Cited in the file of this patent

UNITED STATES PATENTS

2,725,210	Swartz	Nov. 29, 1955
2,741,821	Findley	Apr. 17, 1956
2,945,662	Jennings	July 19, 1960