Dec. 25, 1962 H. G. GATES 3,070,337

SCAFFOLD SUPPORT BRACKET

Filed Dec. 1, 1959 2 Sheets-Sheet 1

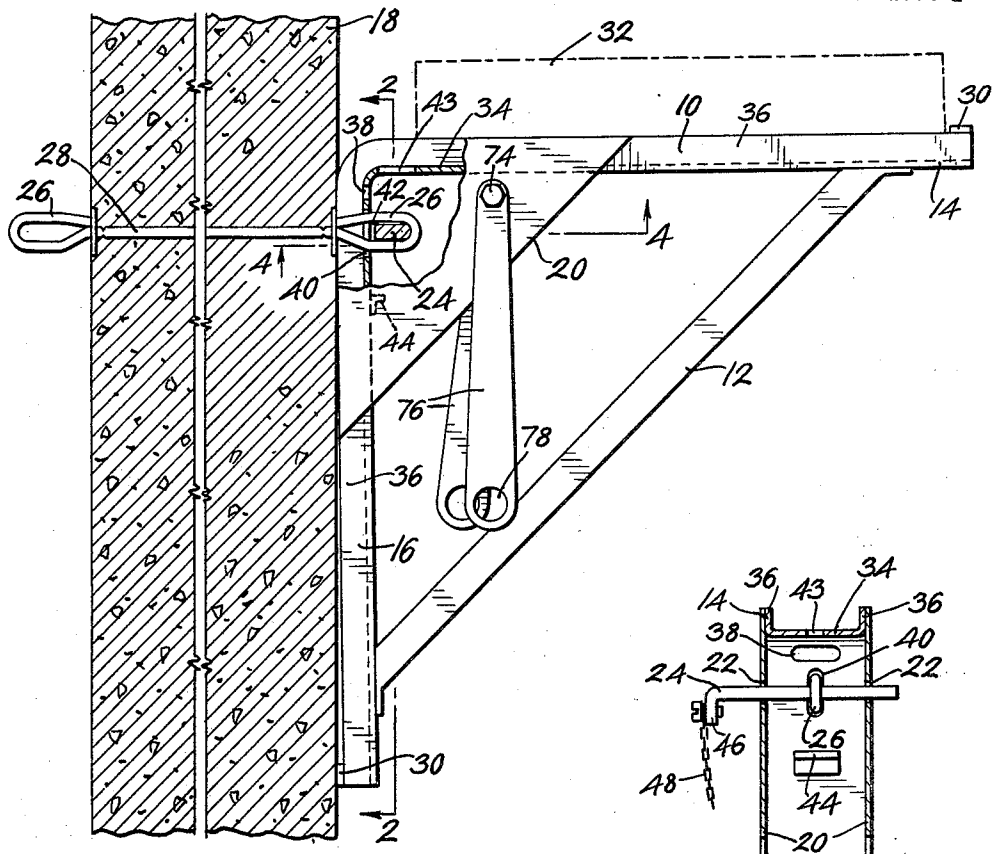


FIG. 1.

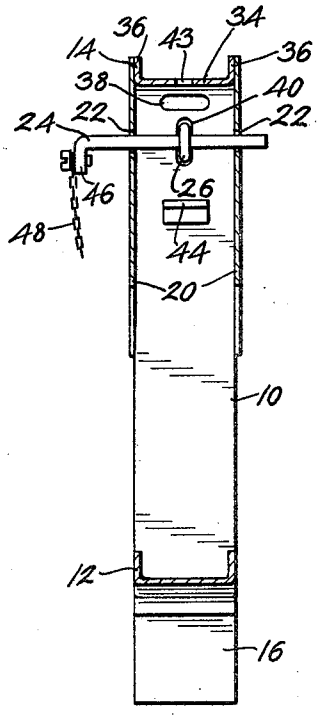


FIG. 2.

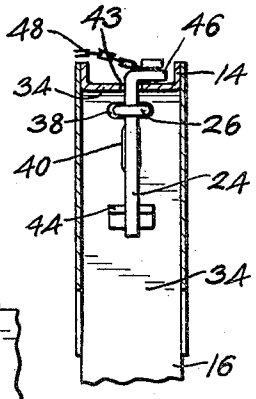


FIG. 3.

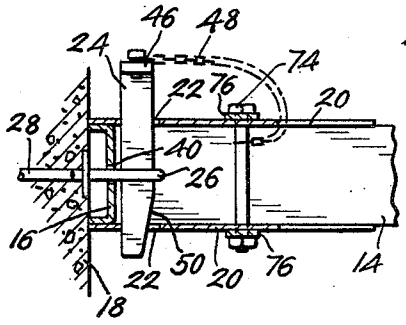


FIG. 4.

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SCAFFOLD SUPPORT BRACKET

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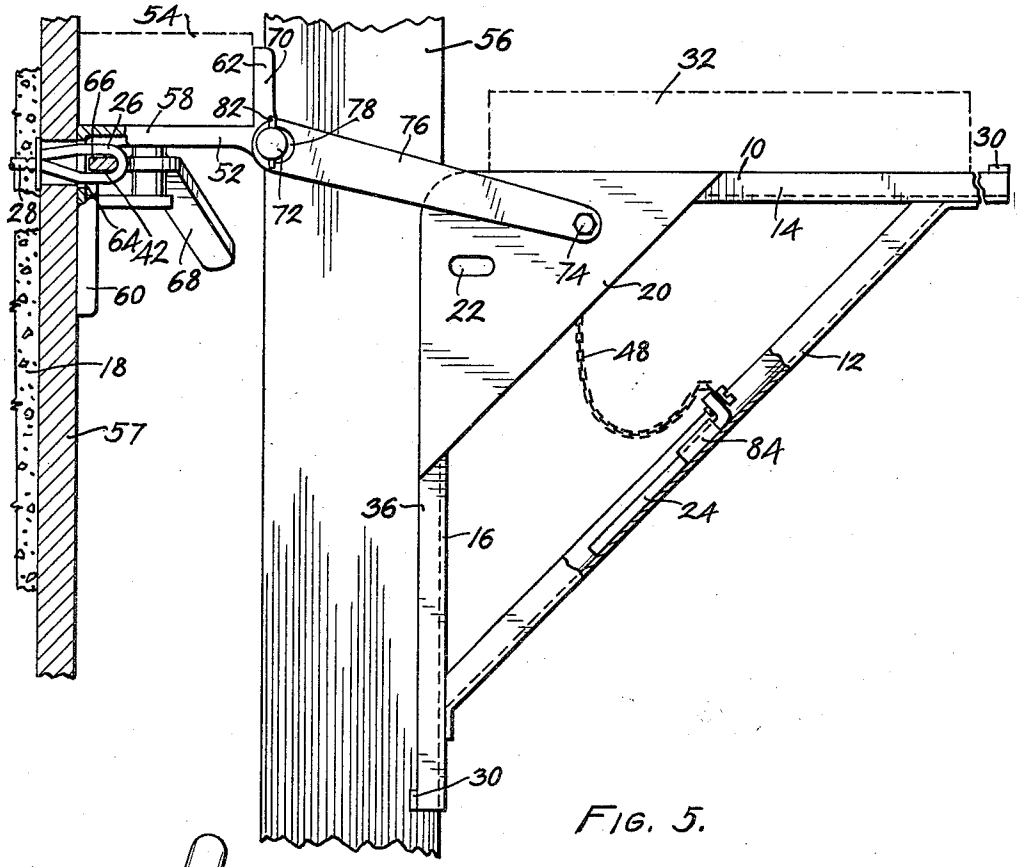


FIG. 5.

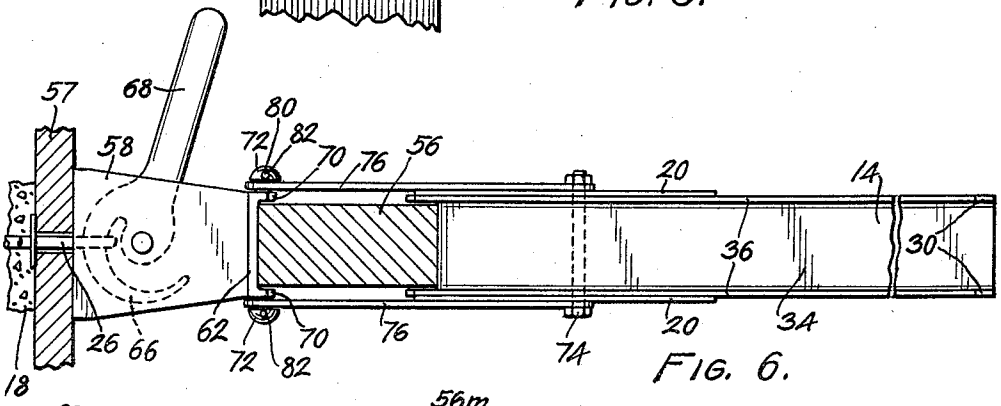


FIG. 6.

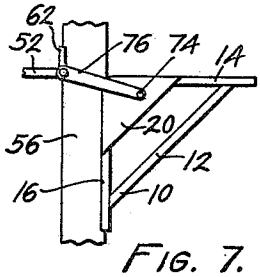


FIG. 7.

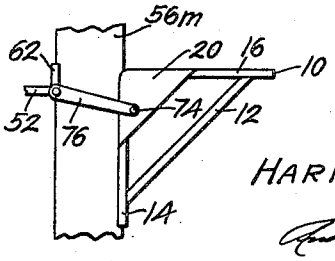


FIG. 8.

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3,070,337

SCAFFOLD SUPPORT BRACKET

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Filed Dec. 1, 1959, Ser. No. 856,470
7 Claims. (Cl. 248—205)

This invention relates to shelf brackets and, more specifically, to a particular style of wall-mounted bracket of a type especially adapted for use as a scafford deck support.

In the construction of multi-storied buildings, ground-supported scaffolds are used for the workmen to stand on while performing the many operations required on the outside walls such as, for example, placement of the finished surface, installation of windows, laying brick, erection of concrete forms, etc. One of the many different types of tubular scaffolding is usually used for this purpose; however, few contractors own their own due to the tremendous expense involved. As a result, the scaffolding is customarily rented or leased for a particular construction job from a company engaged in this business. Even this approach is by no means inexpensive as it is not uncommon to run up a bill of several thousand dollars for scaffold rental on a large building.

Perhaps the single factor having the greatest influence on the cost of such equipment is that it rests on the ground and must, therefore, increase in height along with the building even though the actual usable area or working surface remains substantially the same. In other words, a complex tubular metal framework many stories high may be required to support a deck area only a few feet wide and a length corresponding to one side of the building. This, of course, becomes very costly, especially when compared with the useful working area resulting therefrom.

It has now been found in accordance with the teaching of the present invention that the foregoing problems can be largely overcome through the use of a relatively few inexpensive wall-mounted scaffold support brackets. Such brackets have the considerable advantage of being required only at the working level thus eliminating the need for a complex ground-supported framework. Also, the scaffolding at one level a considerable distance above the ground can be used as a platform while erecting the scaffolding at the next higher level and then removed for use at a still higher level. By following this procedure the lower levels are left unobstructed for the application of brick work, etc., which is not possible with the prior art scaffold systems of the type already mentioned.

The scaffold brackets that comprise the subject matter of the present invention provide for two basically different means for effecting attachment thereof to a wall structure. For a proper understanding of these two attachment systems, a brief explanation of the methods followed in erection of a poured concrete wall structure, which is by far the mostly widely used type of construction employed for large buildings, will be helpful. First of all, a pair of wooden or metal form walls are erected in spaced substantially parallel relation to one another extending several feet above a poured concrete footing. These form walls are maintained in fixed spaced relation to one another by means of a plurality of concrete form ties that span the gap therebetween and end up with the center portions thereof cast permanently within the concrete wall structure. Various locking devices are employed in cooperative relation with the ends of the form ties to maintain the correct position of the form walls. Some of these locking devices consist of rods, pipes, pins, wedges, etc., that are detachably connectable to that portion of the tie projecting beyond the exterior surface of

the form wall. Others comprise a combination tie locking device and supporting bracket for reinforcing timbers such as that described and claimed in my co-pending application Serial Number 845,960, filed October 12, 1959, entitled "Combined Tie Lock and Reinforcing Timber Clamp," now U.S. Letters Patent No. 3,018,538. The latter type of tie lock is becoming more widely accepted for use in the construction of high or extra thick poured concrete wall structures such as are found in multi-storied buildings due to the fact that extra reinforcement for the form walls is required to withstand the substantial increase in hydrostatic pressure exerted on the forms by the wet concrete.

Accordingly, the scaffold support brackets of the instant invention have been designed for detachable connection to either the ends of the form ties directly or to the tie locking devices that are, in turn, releasably attached thereto.

It should be apparent from the foregoing that a number of significant advantages accrue to the user of such a scaffold system. For instance, while the low-level form walls and associated reinforcing timbers are still in place after the concrete has been poured but before it has set up to the extent whereby the forms can be stripped therefrom, it is possible to begin erection of the forms at the next higher level using as a working platform, scaffold decking supported on wall-mounted brackets temporarily attached to the tie locking-devices positioned at the lower level. This procedure can be repeated at successively higher levels by stripping the forms from the low-level and erecting them again at the third-level along with the low-level scaffold using the second level scaffold as a working platform. In addition, even after the forms have been completely stripped from the concrete wall structure, but before the projecting tie ends have been clipped or otherwise removed, the scaffold brackets of the present invention can be detachably connected directly to the ties to provide a scaffold assembly useful in the performance of the exterior finishing operation.

It is, therefore, the principal object of the present invention to provide a novel and improved wall-mounted bracket of a type especially adapted for use as a support for scaffold decking on a poured concrete wall structure.

A second objective is to provide a device of the type decribed herein that is detachably connectable either directly to the projecting ends of form ties cast in a concrete wall structure or the locking devices used in combination with the form ties for holding the form walls in place.

Another object is the provision of a shelf-type bracket that is reversible so as to accommodate reinforcing timbers of varying widths.

Still another objective of the invention claimed herein is to provide a wall-mounted scaffold assembly that is independent of any ground support except for the wall structure itself, thus eliminating the necessity for the complex and expensive ground-anchored framework used in the past.

A further object is to provide a scaffold-support bracket that is easily adaptable for use with any of the popular types and styles of concrete form ties and tie lock mechanisms ordinarily associated therewith.

Additional objectives are to provide a shelf bracket of the class described which is simple to manufacture, easy to use, relatively inexpensive, versatile, lightweight, compact, rugged, safe, and decorative in appearance.

Other objects will be in part apparent and in part pointed out specifically hereinafter in connection with the description of the drawings that follows, and in which:

FIGURE 1 is a side elevation, portions of which have been shown in section and other portions broken away to expose the interior construction, illustrating the scaf-

fold support bracket of the present invention attached in place to the projecting end of a looped-wire form tie cast in a concrete wall structure;

FIGURE 2 is a vertical section taken along line 2—2 of FIGURE 1 showing the manner in which the bracket is releasably locked to the looped end of the tie by means of a removable pin;

FIGURE 3 is a fragmentary section similar to FIGURE 2 except that the bracket has been shown attached to a tie in which the looped end thereof lies in a substantially horizontal plane rather than a vertical one;

FIGURE 4 is a fragmentary section taken along line 4—4 of FIGURE 1 again showing the manner in which the bracket is releasably attached to the concrete wall structure by means of the pin passing through the tie loop;

FIGURE 5 is a side elevation similar to FIGURE 1 with portions shown in section and other portions broken away indicating the manner in which the scaffold bracket of the present invention can be detachably connected to one form of combined tie lock and reinforcing timber clamp instead of directly to the tie itself;

FIGURE 6 is a top plan view of the FIGURE 5 assembly in which the form wall and vertical reinforcing timber have been indicated in section;

FIGURE 7 is a somewhat diagrammatic view similar to FIGURE 5, but to a reduced scale, showing the position of the scaffold bracket when used with a 2 x 4 vertical reinforcing timber; and,

FIGURE 8 is a view much like that of FIGURE 7 except that the bracket has been shown in reversed position to accommodate a 2 x 6 rather than a 2 x 4 vertical reinforcing timber.

Referring now to the drawings for a detailed description of the scaffold support bracket of the present invention, and in particular to FIGURE 1 for this purpose, it will be seen to include a generally L-shaped member **10** having a diagonal strut or brace **12** interconnecting the legs **14** and **16** thereof at a point adjacent their ends. The legs of the L-shaped member are preferably formed integral with one another as shown; whereas, the strut is welded or otherwise permanently attached thereto as a separate element. Both legs are straight and occupy a substantially right-angular relationship to one another such that when one leg is placed flush against a vertical surface, such as concrete wall structure **18**, the other leg will extend outwardly therefrom to provide a horizontal shelf-supporting surface.

The sides of the bracket are partially enclosed by a pair of triangularly-shaped plates **20** welded or otherwise attached to the opposite edges of member **10** at the corner formed by the intersection of the legs. These sideplates **20** include a pair of transversely aligned openings **22** (FIGURES 2 and 4) sized to receive a locking member **24** adapted to connect with the projecting end **26** of a concrete form tie **28** and cooperate therewith to removably attach the bracket to the surface of concrete wall structure **18**. Feet **30** are provided on the free end of each leg of the L-shaped member projecting upwardly therefrom when in horizontal position to provide means adapted to prevent the plank **32** that has been indicated by dot-dashed lines in FIGURE 1, and which form the scaffold deck, from sliding off the end of the bracket when laid thereon.

As shown in FIGURE 1, the scaffold bracket is attached directly to the projecting end **26** of a concrete form tie **28** cast in a wall structure **18**. It should be noted that the form walls have already been stripped from the face of the concrete wall structure but that the projecting end portions **26** of the ties have not been clipped flush with the exterior surface which is customary practice preparatory to the application of a finish. In nearly all concrete forming, the ties are arranged in horizontal rows with spaces of no more than a few feet between adjacent ties; therefore, several brackets may be mounted on the wall spaced only a short distance apart to provide adequate support for the scaffold deck planks and the loads carried thereby. Also, the horizontal rows of ties are customarily located one above the other with a vertical spacing therebetween that does not exceed more than two or three feet at the most. Accordingly, the scaffold brackets can be attached to the wall surface at varying levels and be moved upwardly as the height of the wall increases. As aforementioned, the usual practice is to use the scaffold at one level as a catwalk while erecting the scaffold at the next higher level; whereupon, the low-level scaffold can be removed for use again at a still higher level as the wall height increases.

Now, with reference to FIGURES 1, 2 and 4, it will be seen that in the particular form of the bracket illustrated herein, the L-shaped member **10** is fabricated from channel-shaped stock which provides a web **34** bounded on the side margins thereof by spaced substantially parallel flanges **36**. These flanges are located on the outside of the bracket and are preferably spaced apart a distance adapted to receive a two inch thick reinforcing timber therebetween for reasons that will be set forth in detail hereafter in connection with the description of FIGURES 5–8, inclusive. Furthermore, the channel-shaped construction of the L-shaped member, and also of brace **12**, permits the use of lighter gauge stock to provide the required structural strength.

Certain types of concrete form ties, particularly strap ties having openings through the end portions and looped-wire ties such as that illustrated, can be oriented in different ways insofar as their position in the wall is concerned. Generally speaking, however, they are installed to receive a locking member passed either vertically or horizontally through the opening in the end thereof.

In order to adapt the instant bracket for use under the aforementioned conditions, a transverse tie slot **38** and a longitudinal tie slot **40** are provided in the web of one of the legs **16** adjacent the corner of the L-shaped member. The longitudinal tie slot **40** provides means adapted to pass a vertically-disposed tie end **26** into position such that a locking device **24** passed through the aligned openings **22** in the sideplates will also pass through the opening **42** in the end of the tie thus detachably mounting the bracket on the wall surface as shown in FIGURES 1, 2 and 4.

FIGURE 3 illustrates the manner in which the bracket is connected to a tie having a horizontally-disposed end portion rather than a vertical one as was the case in FIGURES 1, 2 and 4. Here, the tie end **26** is passed through the transverse tie slot **38** in the web portion **34** of the leg **16**. Note, however, that in this instance a longitudinal slot **43** in the web portion of the other leg **14** functions in the manner of aligned openings **22** in the sideplates to pass the locking member **24** into position for insertion through the opening **42** in the tie end **26**. In the preferred embodiment of the bracket illustrated herein, an ear **44** is fastened to the inside of web **34** of leg **16** in position to cooperate with the longitudinal slot **43** in the other leg to maintain the locking member tightly engaged within the loop or opening in the form tie when the leg **16** of the bracket is resting against the face of the wall. In other words, locking member **24** should not be inclined relative to the tie end such that the force exerted thereon tends to back the former out of the opening in the latter.

For purposes of illustration, a loop-ended wire tie **28** such as that which forms the subject matter of copending application Serial Number 845,813, filed October 12, 1959, entitled "Concrete Form Tie," assigned to the same assignee, now abandoned, has been shown in FIGURES 1–4, inclusive, as the means for attaching the bracket to the concrete wall structure; however, it is to be clearly understood that many other types and styles of concrete form ties can also be used such as, for example, twisted wire ties, strap ties, etc., with equal success. In this

same connection, the specific type of locking member 24 shown herein is one that is ideally suited for use with loop-ended ties; whereas, certain other types of locking devices function more satisfactorily with ties of a different style. By way of illustration, a so-called "button-type" tie which has a head on each end is customarily used with a generally wedge-shaped locking device having a longitudinal key slot therein. Slight modification in the shape and size of the tie slots in the bracket may also be required in certain instances depending upon the configuration of the tie end that must pass therethrough. As a general proposition, therefore, it can be said that the particular locking device to be used with the bracket can conform quite closely to the locking device ordinarily used with a given type of form tie to hold the form walls in place thereon because, in one sense at least, the operative connection between the tie end and both the form wall and bracket are much the same.

The specific pin-type locking member 24 that has been shown in the drawings is designed for use with a loop-ended wire tie and includes a stop-forming head 46 on one end adapted to engage the web of leg 14 or one of the sideplates and prevent said pin from passing on through the slot. As illustrated, the locking device is secured to the bracket by a short length of chain 48 to prevent loss thereof. Also, one edge of the locking pin has been cut on the bias to provide a cam surface 50 adapted to enter the looped-end 26 of the tie and urge the bracket tightly against the surface of the wall.

Reference will now be had to FIGURES 5 and 6 of the drawing wherein the means provided for attaching the bracket to a tie locking device of the type that is also used to clamp reinforcing timbers to the form walls will be described. In some operations, especially that of erecting forms on top of a wall section that has already been poured, it is desirable to be able to attach scaffolding to a partially completed wall structure before the forms have been stripped therefrom. It, therefore, becomes necessary to connect the brackets to the locking device rather than directly to the tie.

The particular tie locking device 52 illustrated herein, as has already been mentioned, forms the subject matter of my co-pending application Serial Number 845,960, filed October 12, 1959, entitled "Combined Tie Lock and Reinforcing Timber Clamp," now U.S. Patent 3,018,538, and in addition to its tie-locking function forms means for clamping both horizontal and vertical reinforcing timbers 54 and 56, respectively, to the face of the form wall 57. When constructing multi-storied buildings, where scaffolding is needed, extra-thick walls are generally used that require the additional form reinforcement provided by timbers 54 and 56. Accordingly, a proper scaffold bracket must be compatible with forms erected to contain these reinforcing timbers which are nearly always present.

The combined tie lock and reinforcing timber clamp 52 will be seen to include a generally Z-shaped bracket having a web portion 58 terminating at the inner end in a downturned flange 60 and at the outer end in an upturned flange 62. The downturned flange includes an opening 64 adapted to pass the end portion 26 of the tie into position to receive the arcuate finger 66 of latch 68 mounted for pivotal movement on the underside of the web portion 56. The upturned flange 62 cooperates with the web portion 58 and with the form wall 57 to define a horizontally disposed channel adapted to receive the horizontal reinforcing timber or waler 54 clamping same in place. The outer face of the upturned flange 62 has outturned edges 70 that also define a channel sized to receive the thickness of the vertical reinforcing timber or strongback 56. Button-headed pins 72 project laterally from the outturned edges 70 of the upturned flange and ordinarily provide means for attaching a bail (not shown) to the Z-shaped bracket for use in holding the strongback 56 in place; however, when the scaffold brackets are to be used therewith, they perform the function of the bail as will presently appear.

Now, it can be seen that the sideplates 20 are interconnected with a transversely extending pin element 74 onto the ends of which are pivotally attached a pair of arms 76 having openings 78 in the free ends thereof sized to receive the button-headed pins 72 depending from the side edges of the Z-shaped bracket. With the scaffold bracket positioned as shown in FIGURE 6 such that the outer edge of the strongback 56 is located in the channel defined in the leg of L-shaped member 10 while the inner edge lies within the channel in the upturned flange of the Z-shaped bracket, the arms 76 extend inwardly along opposite sides of the strongback 56 where they are attached to pins 72 thus forming means for holding said reinforcing timber against the clamp 52. The channel-shaped construction of the legs of L-shaped member 10, of course, prevent the scaffold bracket from turning relative to the strongback. When the arms 76 are passed into position behind the button-type heads on pins 72, there is little likelihood of their coming loose accidentally; however, as an added precaution, the heads are provided with openings 80 therethrough adapted to receive a nail or other type of locking pin 82 (FIGURE 5).

A few other points should be mentioned before proceeding with a description of FIGURES 7 and 8. First of all, the above-described system is completely operative irrespective of whether the horizontal reinforcing timber or waler 45 is used. Also, in this situation, the locking member 24 is not required and may be conveniently stowed in a clip 84 provided on the brace 12 as shown.

Finally, with reference to FIGURES 7 and 8, the scaffold bracket construction which enables it to be used with vertical reinforcing timbers of various widths will now be described. Note that the position of pivot pin 74 on the sideplates 20 is such that it is located considerably closer to leg 14 than to leg 16. In actual practice, these distances are about two inches and four inches, respectively.

Only two sizes of vertical reinforcing timbers 56 are in common use, namely, a 2 x 4 and a 2 x 6. When a 2 x 4 is used, leg 16 of the bracket is placed against the outer edge thereof as shown in FIGURES 5, 6 and 7 with leg 14 being used to provide support for the deck planking. In this position, pivot pin 74 is located farthest away from the adjacent edge of the reinforcing timbers. When a 2 x 6 strongback 56*m* is used, on the other hand, the bracket is reversed as in FIGURE 8 so that leg 14 rests against the timber and leg 16 is the horizontal supporting element. In the latter position, pin 74 is much closer to the edge of the timber thus increasing the effective length of the arms 76.

It will be obvious from an examination of either of these figures, that when a load is applied to the scaffold, the brackets will tend to swing downwardly and inwardly in an arcuate path thus forcing the vertical reinforcing timber tightly against the upturned flange of the combined tie lock and reinforcing timber clamp 52. It is also possible, of course, to adapt the claimed scaffold bracket for use with other types of tie locking devices by minor modification thereof well within the purview of one skilled in the art.

Having thus described the several useful and novel features of the scaffold support bracket of the present invention in connection with the accompanying drawings, it will be apparent that the several worthwhile objectives for which it was designed have been achieved. Although but a single specific form of the invention has been illustrated and described herein, I realize that certain changes and modifications may well occur to those skilled in the art within the broad teaching hereof; hence, it is my intention that the scope of protection afforded hereby shall be limited only insofar as said limitations are expressly set forth in the appended claims.

What is claimed is:

1. In combination in a wall-mounted scaffold assembly, at least two concrete form ties cast in a concrete wall structure with their end portions projecting outwardly therefrom in horizontally-spaced relation to one another, at least two generally L-shaped brackets having a pair of legs arranged in normal relation to one another, and fastening means adapted to detachably interconnect one leg of each bracket with one of the projecting end portions of the form ties and maintain the brackets in position such that the other legs thereof extend outwardly from the wall structure defining supports for scaffold deck-forming planks spanning the space therebetween, the fastening means comprising a generally Z-shaped bracket that includes a horizontal web portion having an upturned flange along the outer edge thereof and a downturned flange provided with an opening adapted to pass the end portion of the tie along its inner edge, a first connector detachably connecting the downturned flange of the Z-shaped bracket to the end portion of the tie, and a second connector detachably connecting the L-shaped bracket with the Z-shaped bracket.

2. The combination as set forth in claim 1 in which, the upturned flange of the Z-shaped bracket includes a pair of outturned ribs along the side edges thereof defining therewith a channel, a reinforcing timber is mounted in an upright position with the inner edge thereof in the channel formed in the outer face of the upturned flange of the Z-shaped bracket, at least one leg of the L-shaped bracket is shaped to provide an inwardly-facing longitudinal channel adapted to receive the outer edge of the reinforcing timber, and the second connector comprises a pair of arms extending along opposite sides of the reinforcing timber.

3. The combination as set forth in claim 1 in which, a form wall is interposed between adjacent faces of the concrete wall structure and the downturned flange of the Z-shaped bracket.

4. The combination as set forth in claim 1 in which, a pair of headed pins project laterally in opposite directions from the sides of the Z-shaped bracket, and the second connector comprises a pair of arms having their outer ends pivotally connected to the sides of the L-shaped bracket and openings in their inner ends adapted to pass the heads of the pins projecting from the Z-shaped bracket.

5. The combination as set forth in claim 3 in which the web portion of the Z-shaped bracket, the upturned flange thereof and the form wall cooperate with one another to define an upwardly opening channel adapted to receive the width of a horizontally-disposed reinforcing timber.

6. A shelf bracket adapted for attachment to the projecting looped end portion of a wire concrete form tie cast in a concrete wall structure which comprises, a generally L-shaped member having a pair of legs interconnected in normal relation to one another, an angularly-disposed brace interconnecting the free ends of the legs, at least one of said legs having at least one elongate slot therein

adjacent the corner formed by the intersection of the legs adapted to pass the looped end portion of the concrete form tie and cooperate therewith to maintain said leg in substantially vertical position on the wall structure with the other leg projecting outwardly therefrom in shelf-supporting position, and fastening means adapted to detachably interconnect said slotted leg to the tie by insertion thereof through the looped end of the tie wherein the elongate slot in the leg extends longitudinally thereof in position to pass a vertically-disposed looped end of a concrete form tie and wherein the fastening means comprises a pin, sideplates are provided on the sides of the L-shaped member in the corner thereof, and in which said sideplates include transversely aligned openings sized and positioned to pass the pin through the looped end of the form tie when located within the longitudinal slot in the slotted leg.

7. A shelf bracket adapted for attachment to the projecting looped end portion of a wire concrete form tie cast in a concrete wall structure which comprises, a generally L-shaped member having a pair of legs interconnected in normal relation to one another, an angularly-disposed brace interconnecting the free ends of the legs, at least one of said legs having at least one elongate slot therein adjacent the corner formed by the intersection of the legs adapted to pass the looped end portion of the concrete form tie and cooperate therewith to maintain said leg in substantially vertical position on the wall structure with the other leg projecting outwardly therefrom in shalf-supporting position, and fastening means adapted to detachably interconnect said slotted leg to the tie by insertion thereof through the looped end of the tie wherein the slotted leg includes a transverse slot adapted to pass a horizontally-disposed looped end of a concrete form tie and a longitudinal slot adapted to pass a vertically-disposed tie loop and wherein the fastening means comprises a pin, the other leg of the L-shaped member is provided with an opening sized and positioned to pass the pin through the looped end of the tie when located within the transverse slot in the slotted leg, a pair of sideplates are attached to the sides of the L-shaped member in the corner thereof, and said sideplates include a pair of transversely aligned openings sized and positioned to pass the pin into the looped end of the form tie when located within the vertically-disposed slot in the slotted leg.

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