Nov. 7, 1961 W. H. KENNEY 3,007,221

NAIL FREE WALL FORM ASSEMBLY DEVICE

Filed Oct. 6, 1958 4 Sheets-Sheet 1

Fig. 1.

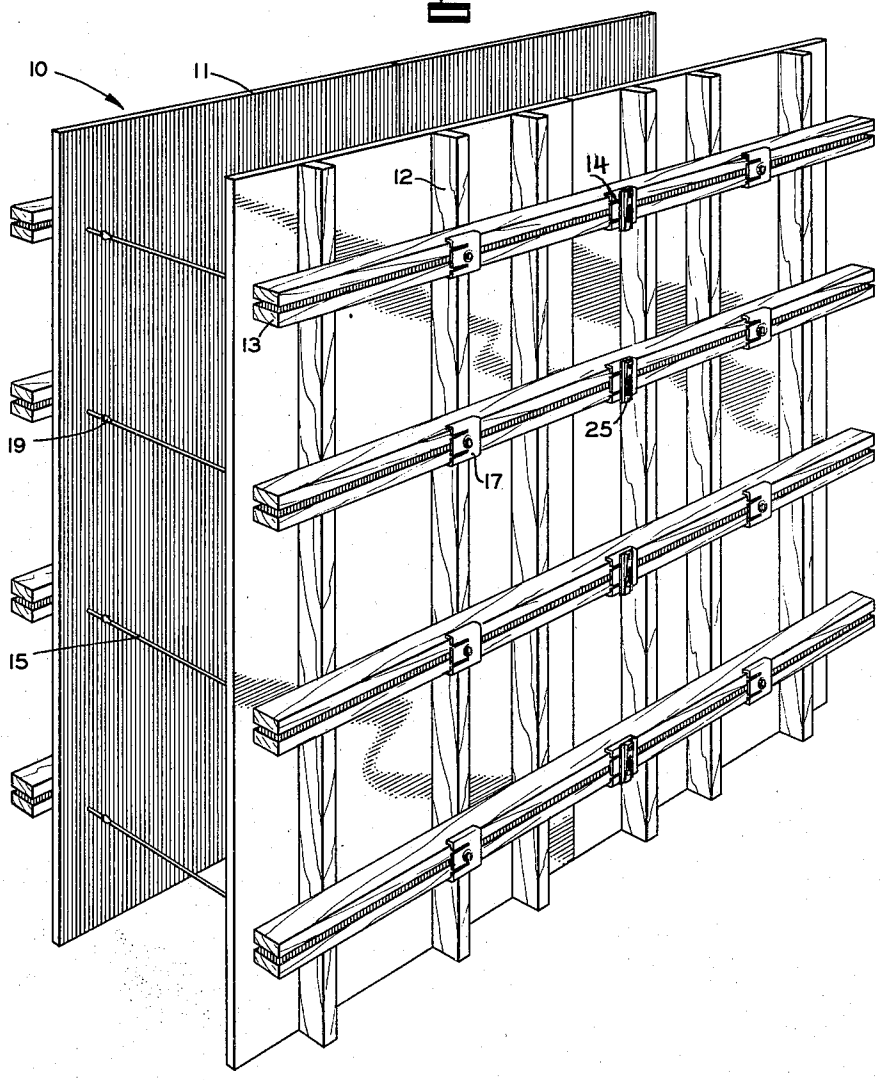
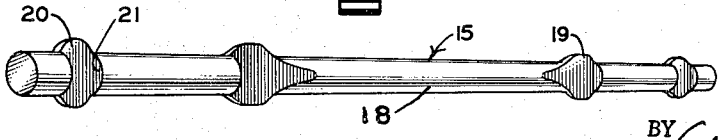



Fig. 2.




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Filed Oct. 6, 1958 4 Sheets-Sheet 2

Fig. 2.

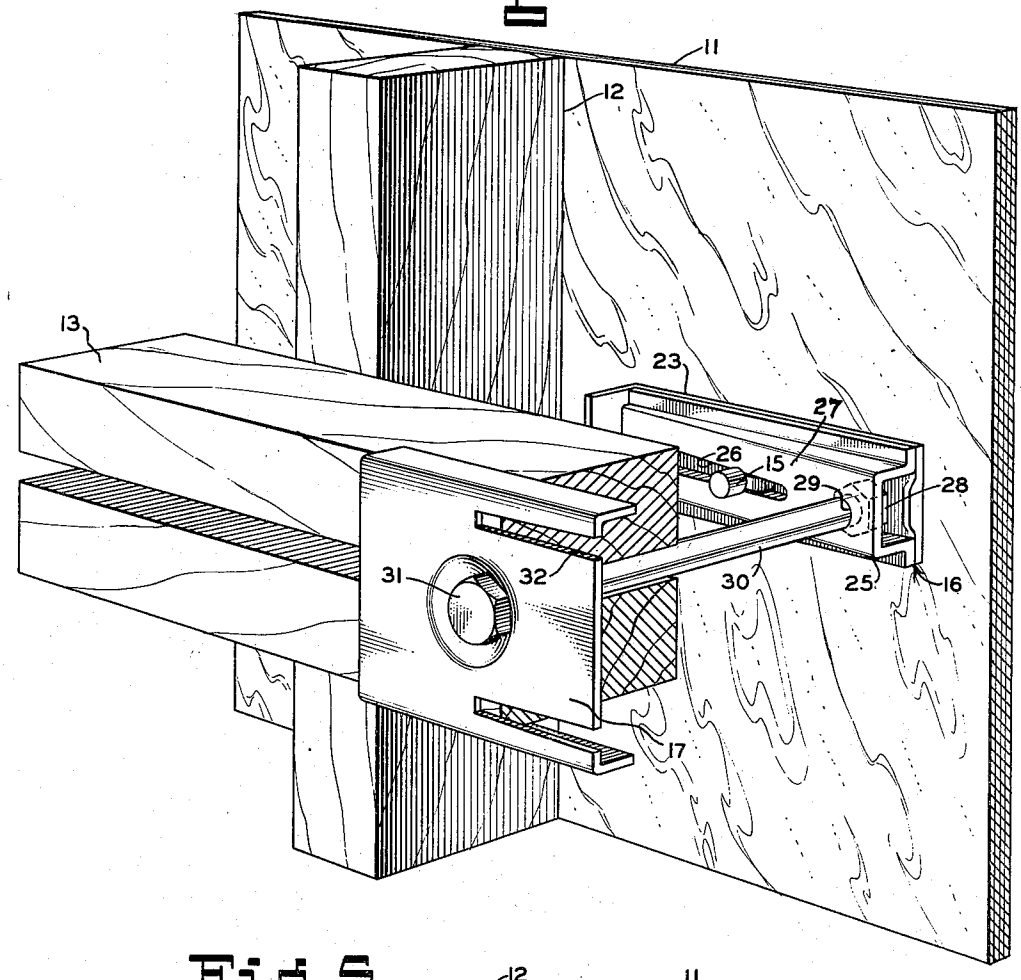
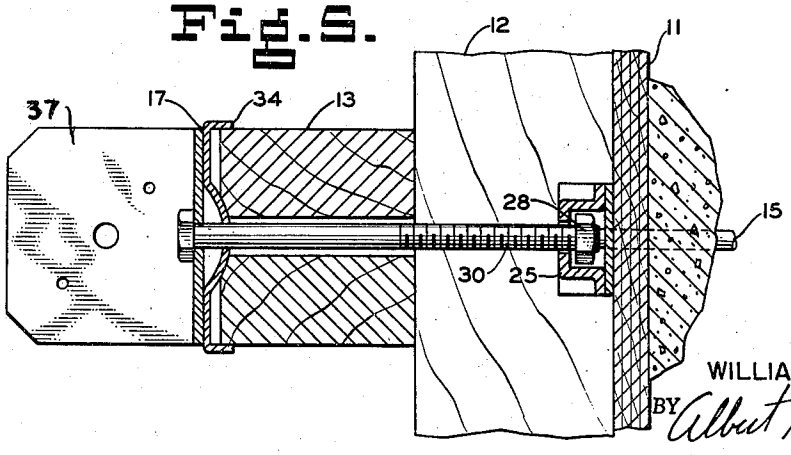



Fig. 5.




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NAIL FREE WALL FORM ASSEMBLY DEVICE

Filed Oct. 6, 1958 4 Sheets-Sheet 3

Fig. 3.

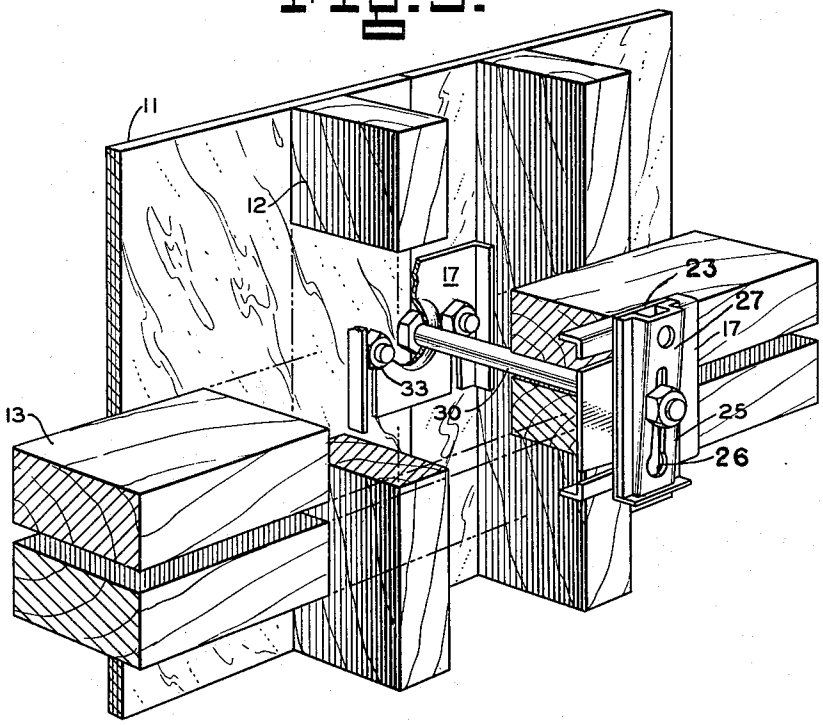
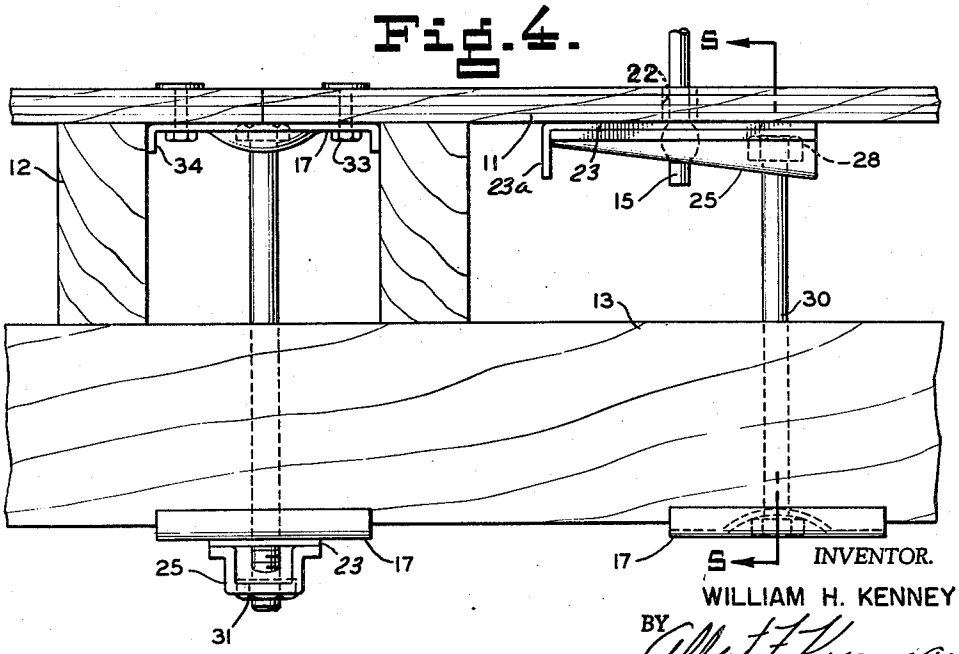



Fig. 4.




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NAIL FREE WALL FORM ASSEMBLY DEVICE

Filed Oct. 6, 1958 4 Sheets-Sheet 4

Fig. 6.

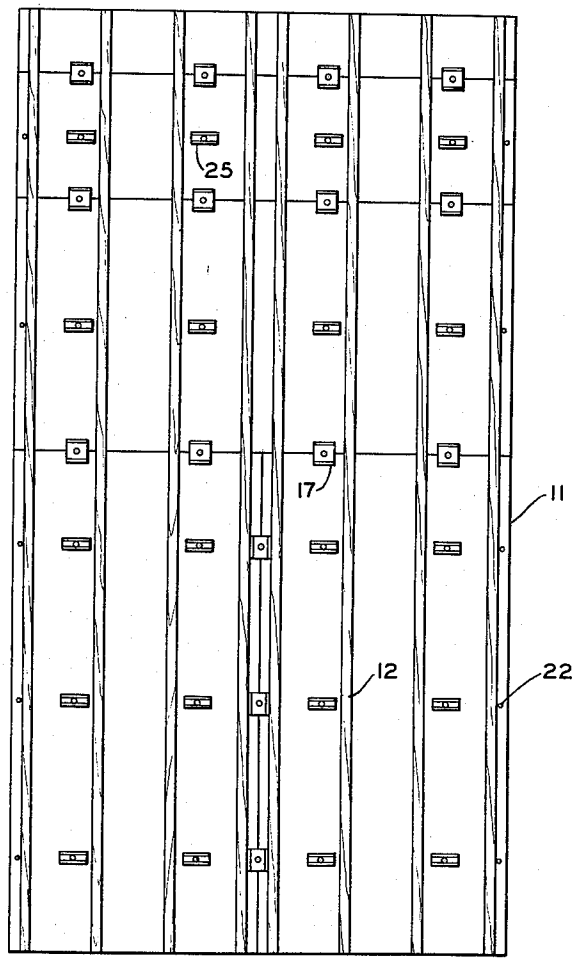
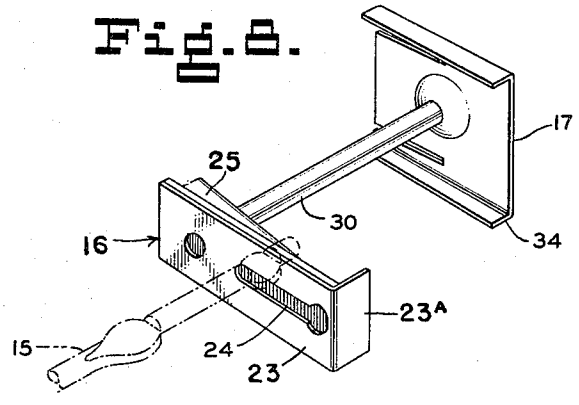



Fig. 8.




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United States Patent Office 3,007,221 Patented Nov. 7, 1961



3,007,221

# NAIL FREE WALL FORM ASSEMBLY DEVICE

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3 Claims. (Cl. 25—131)

This invention relates to wall forms and particularly such as are used for pouring concrete, cement and the like for architectural purposes.

Presently known forms are either fabricated at the building site or consist of a large number of prefabricated elements which are secured together to receive the concrete or cement mix. All of these forms require nailing and fastening means which consume time and render the lumber employed in the construction of the forms useless for subsequent purposes.

Accordingly, it is an object of the present invention, to provide a wall form system which will not require the use of nails.

Another object of the present invention is to provide a wall form system requiring a minimum number of elements for form erection.

Still another object of the present invention is to provide a wall form system which may be erected with relatively unskilled labor.

A further object of the present invention is to provide a wall form system which will effect a substantial saving in materials and labor.

An object of the present invention is to provide a wall form system in which all of the lumber is of standard and therefore easily obtainable dimensions.

A feature of the present invention is its round bar-shaped tie which may be inserted from either side of the wall form system.

Another feature of the present invention is its waler hook construction which may be used to secure adjacent panels together and also support walers.

Still another feature of the present invention is its spacer-wedge member for fastening the panels to the ties.

The invention consists of the construction, combination and arrangement of parts, as herein illustrated, described and claimed.

In the accompanying drawings, forming a part hereof, is illustrated one form of embodiment of the invention, in which drawings similar reference characters designate corresponding parts, and in which:

FIGURE 1 is a view in perspective showing spaced assembled wall form panels made in accordance with the present invention.

FIGURE 2 is a fragmentary view in perspective partly broken away and enlarged to show the panel fastening means.

FIGURE 3 is a fragmentary view in perspective partly broken away to show the panel aligning and holding means.

FIGURE 4 is a top plan view of the fastening means shown in FIGURE 2.

FIGURE 5 is a sectional view taken on line 5—5 of FIGURE 4 looking in the direction of the arrows.

FIGURE 6 is a view in front elevation showing the manner in which panels of different sizes can be secured together.

FIGURE 7 is a view in perspective of a tie used in the present wall form system.

FIGURE 8 is a view in perspective taken from the panel side thereof showing a combined spacer wedge and a plate and waler hook assembly.

Referring to the drawings and particularly to FIGURE 1, 10 indicates a wall form system comprising spaced panel members 11 which may be made of plywood, hardboard, or some suitable material having an inner cement pouring face. Vertical studs 12 support the outside surface of the panel members 11. Horizontal walers 13 which serve to strengthen and align the studs 12 are secured to the wall form system as will be hereinafter more fully described. The studs 12 and walers 13 may consist of readily available "two by fours" as illustrated. If additional waler strength is desired, "two by sixes" may be substituted at this point in the wall form system.



The wooden members of the wall form system are fastened together by interlocking accessories generally indicated at 14. The accessories 14 include ties 15 (best shown in FIGURE 7) combined spacer wedge members 16 and waler hooks 17.

The ties 15, as shown in FIG. 7, consist of an elongated bar 18 which may be made of round stock. Weakening or break back recesses 19 are made in the tie 15 at points spaced from each end thereof, so that they will lie within the poured structure as illustrated in FIGURES 1 and 5. The break back recesses 19 have sufficient strength to support the forms during the pouring operation, but will break after the wall of concrete has hardened if the end of the tie 15 is twisted in the manner hereinafter more fully described.

Wedge engaging recesses 20 are formed at each end of the tie 15. The recesses 20 have shoulders 21 at each end thereof to receive the spacer wedge member. The recesses 19, 20 may be formed by means of suitable dies which swage the metal from the bar stock to form a unitary tie structure.

The ties 15 may be slid between the spaced panel members 11 through accurately spaced holes 22 which are provided in each of the panels 11 for this purpose. The ties 15 will project a short distance beyond the panels 11 as shown in FIGURES 2, 4 and 5. The projecting ends of the ties 15, as shown in FIGURE 2, are adapted to receive thereon the combined spacer wedge member 16.

The spacer wedge 16 is formed with a flat spacer plate 23 which bears against the outer face of the panel 11 and has a slotted opening 24 therein, as best shown in FIGURE 8. The slotted opening 24 slips over the recess 20 at the end of the tie, and bears against the inner shoulder 21 of said recess. An outwardly bent flange 23A is provided on the plate 23 and is used in breaking back the ties. The workman can strike the flange 23A with a bar or hammer to twist and break the ties 15 at the weakening notches 19. A wedge member 25 is welded to the front of the plate 23. The wedge 25 is provided with a keyhole slot 26 on the inclined plane 27 thereof, which slot engages the tie recess 20 and bears against the outer shoulder 21 of the said recess. With the spacer wedge member secured to the tie, the tie cannot be pulled into the space between the panels 11 by the tightening of the wedge 16 on the opposite side of the spaced panel assembly. The distances between the panels 11 is thus established and maintained from the outside of the wall form system. Presently used interior form panel spacer members are, therefore, not required. The spacer wedge 16 is provided with a nut member 28, which is carried in the upper portion thereof, as shown in FIGURES 2 and 5. The nut member 28 is in register with an opening 29 in the inclined plane 27. A waler bolt 30 is received within the opening 29 and threaded into the nut 28. The outer end of the waler bolt 30 is provided with a head 31 for tightening the bolt and preventing the waler hook 17, which is slidably carried on the bolt 30, from leaving the bolt. The waler hook 17, bolt 30, and spacer wedge 16 form a combined element which can be handled as one fastening accessory during the erection of the form.

As shown in FIGURES 2 and 3, the waler hook 17

is provided with spaced tapered slots **32**. The slots **32** are used where adjacent panels **11** are to be held in abutting relationship. For this purpose, the panels **11** are provided with flat-headed bolts **33**, commonly known as plywood bolts, which are inserted in holes within the panels **11** at suitable intervals. The waler plates **17** may be removed from their wedge assembly, a bolt **30** slipped through the central opening **35** therein and the tapered slots **32** slipped over the plywood bolts **33** until the adjacent panels **11** are forced tightly together. The waler plate **17** is preferably formed with a concave portion **36** about the opening **35** to receive the bolt head **31** and permit the plate to lie flush against the panel **11**. A second waler plate **17** is then slipped over the extending end of the bolt **30**, as shown in FIGURE 3 and a spacer wedge **25**, on the nut **28**, used to lock the walers **13** tightly against the studs **12**. When the studs **12** and walers **13** are slipped into place, the panels **11** are secured together and aligned without the need of further nailing.

Referring to FIGURE 6, it will be seen how panels **11** of different sizes may be employed to achieve forms of any desired height. In FIGURE 6, panels **11** having standard four by eight foot size are combined with panels having 2 x 8 and 1 x 8 dimensions to get desired wall heights. The panels **11** have drilled holes **22** to receive the ties **15** and plywood bolts **33**.

When it is desired to erect a wall form in accordance with the present system, panel members **11** are placed upon suitable footings (not shown) and secured together by means of the waler hooks **17**, as shown in FIGURES 3 and 6.

Thereafter, the top waler members **13** are laid upon the waler bolts **30**. The studs **12** may then be slipped between the top walers **13** and the panel **11**, and rotated into the positions shown in FIGURES 1, 2 and 3. The bottom waler members **13** are then slid into place on top of the flanges **34** of the waler hook **17**. The waler bolt **30** may be tightened by means of the bolt head **31** to lock the wood members together. Ties **15** can then be inserted through the openings **22** in the panels **11** and secured on each end, as shown in FIGURE 5, by the spacer wedge members **16**. Additional walers hooks **17** are secured to the waler bolts **30** and grasp within their flanges **34** the walers **13**. When the bolts **30** are tightened, the entire assembly will be rigidly locked together ready for pouring. Brace supporting angles **37** may be combined with the waler hooks **17**, as shown in FIGURE 5 where desired.

After the concrete has hardened between the forms, the bolts **30** are loosened until the walers **13** can be slipped out of the waler hooks **17**. The studs **12** will thereupon fall away from the panels **11**. The spacer wedge members may then be used as a wrench to break back the ties **15**. As the spacer wedges **16** are twisted, they will cause the ties **15** to break at the weakening notches **19** which are well within the poured panel. The resulting small hole may be finished with cement to provide a smooth unbroken wall surface.

When the ties **15** are broken, the panels **11** will fall free of the poured wall and may be used again. Since there are no nails used in the erection or stripping of the form, the lumber will remain useable over a large number of operations, and the supporting studs and walers may even find their way into framing and other architectural uses in the construction of the building.

It will be apparent that very little of the tie metal is wasted, and that only a small portion of the tie need project beyond the wall form in the present assembly.

In erecting the present forms, workmen need only carry ties, waler plate and bolt assemblies, and the spaced wedge-waler hook assembly. Miscellaneous hardware is thus reduced to a minimum, and the only tool necessary to erect or strip a form will be a hammer, which is used to drive the various elements into engagement with the ties or plywood bolts and break back the ties in stripping. Studs **12** of any available length may be used, and variations in lumber thicknesses can be taken up by means of the bolt **30**.

Where it is desired to crane handle a large section of forms without completely disassembling them it is possible to remove the waler hooks and bolts from the spacer wedges **25**. The wedges **25** can then be struck to break back the ties **15**. The remaining hooks, bolts, studs, walers and hardware in the forms will hold the assembly rigidly together so that they can be moved as a unit. A great saving in erecting costs is thus possible. Once set up at the next pouring operation it is merely necessary to push new ties through the panels **11** and secure them in place as hereinabove set forth.

From the foregoing it will be apparent that there has been provided an extremely simple nail-free wall form system which is economical of materials, reuseable and easily erected and stripped, without the need for complicated tools or operations.

Having thus fully described the invention what is claimed as new and desired to be secured by Letters Patent of the United States is:

1. A spacer wedge member for securing panels into a rigid wall form assembly comprising a wedge shaped member, a keyhole slot in said wedge, a spacing plate on said wedge, an elongated slot on said plate, said slots being in register and a bolt receiving member carried by said wedge.

2. A spacer wedge member for securing panels into a rigid wall form assembly comprising a wedge shaped member, a keyhole slot in said wedge, a spacing plate on said wedge, an elongated slot on said plate, an outwardly extending flange on said plate, said slots being in register and a bolt receiving member consisting of a nut carried by said wedge.

3. A device for interconnecting and securing panels into a rigid wall form assembly comprising, in combination, a wedge shaped member, an elongated keyhole slot in said wedge, a spacing plate on one side of said wedge, an elongated slot on said plate in register with the wedge slot, an opening in said wedge, a nut in register with said opening between the wedge and plate, an elongated bolt threadably received at one end by the nut and a plate member carried upon the free end of the bolt.

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