July 18, 1939. A. M. KINNINGER ET AL 2,166,444

WEDGE FOR USE WITH WALL TIES

Filed March 2, 1936

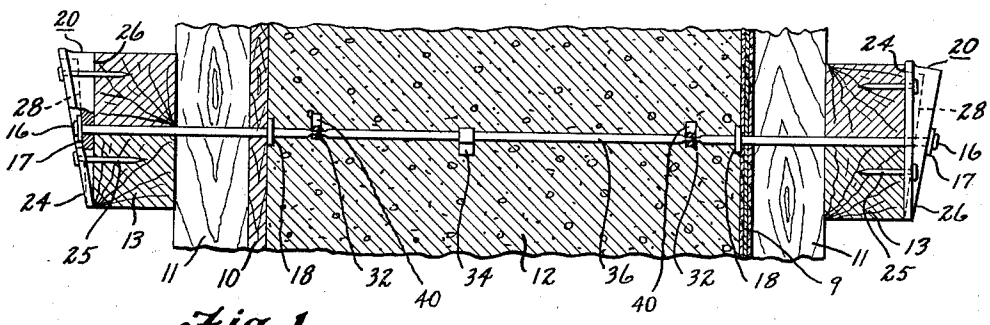


Fig. 1

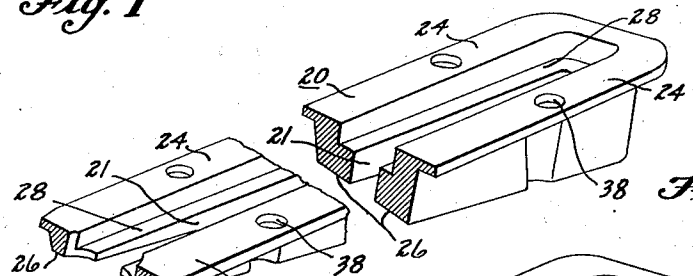


Fig. 3

Fig. 2

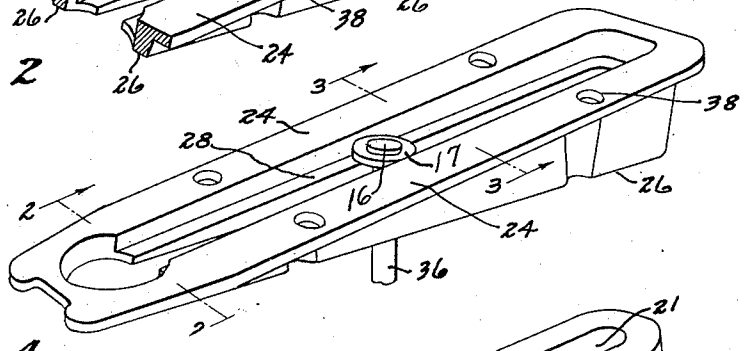


Fig. 4

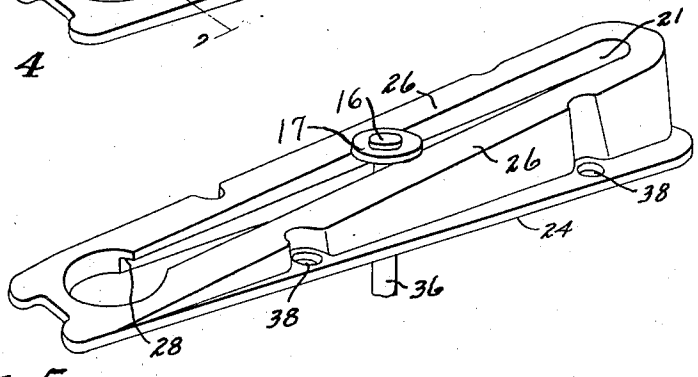


Fig. 5

INVENTOR.
Arthur M. Kinninger
Carl A. Kinninger
BY
Walker & Dybvig
ATTORNEY.

Patented July 18, 1939 2,166,444

UNITED STATES PATENT OFFICE

2,166,444

WEDGE FOR USE WITH WALL TIES

Arthur M. Kinninger and Carl A. Kinninger,
Dayton, Ohio

Application March 2, 1936, Serial No. 66,668

5 Claims. (Cl. 25—131)

This invention relates to devices for holding concrete forms in position when the concrete is poured and in more particular to a duo-functional reversible wedge.

It is customary in many parts of the country to hold concrete forms in fixed spaced relation by tie rods. The tie rods may be provided with spacers abutting the inside of the forms and opposite heads adjacent each end receiving a wedge clamping the form assembly in position. The type of forms may be specified by the architect. It is not unusual for an architect to specify the use of thin ply wood boards as retaining walls on one side of the concrete wall and heavy rough lumber on the opposite side. For the purpose of illustration the architect may specify ply wood 5/8" thick to be used on one side of the concrete and 1" rough boards on the other. In the past this has required a tie rod designed specifically for the job, which tie rod is provided with a greater distance between the spacer and the corresponding head for use with the heavy rough boards than the distance from the opposite spacer to its head used with the ply wood. When such tie rods are used it is necessary for the workman to get the tie rod turned in the proper direction as an end to end reversal defeats the design of the rod.

An object of this invention is to provide a duo-functional reversible wedge which has a comparatively thick wedging body that may be used if there is a considerable distance to be taken up by the wedge between the whaler and the head of the tie rod and which has another wedging body that is comparatively thin that may be used for taking up a small distance between the whaler and the head of the tie rod.

Another object of this invention is to provide a duo-functional reversible wedge that is easily constructed, that is cheap, efficient in its use, requiring the minimum amount of labor in assembly and that is at the same time dependable.

With the above primary and other incidental objects in view as will more fully appear in the specification, the invention consists of the features of construction, the parts and combinations thereof, and the mode of operation, or their equivalents, as hereinafter described and set forth in the claims.

In the drawing, Fig. 1 shows a transverse sectional view of a tie rod utilizing the duo-functional wedge.

Fig. 2 is a fragmentary sectional view drawn to an enlarged scale, taken substantially on the line 2—2 of Fig. 4.

Fig. 3 is a sectional view taken substantially on the line 3—3 of Fig. 4.

Fig. 4 is a perspective view of the wedge with the wide portion of the channel facing upwardly.

Fig. 5 is another perspective view with the wedge turned upside down from the position disclosed in Fig. 4.

Fig. 1 is drawn to a smaller scale than used in the other figures.

Wall ties of the present character are used but once and are left embedded in the concrete structure. Consequently it is desirable that the ties be of such construction as to be very cheaply and economically manufactured. It is also desirable that such ties have no parts to become disarranged or misplaced and such as not to require assembly at the time of installation. The present form of tie is extremely simple but has been found in practice to be highly efficient and capable of being easily and rapidly installed. Referring to the drawing, 9—10 are the side walls of a concrete form comprising superposed form boards supported by the upright standards or posts 11—11 at the outer sides thereof. In the present instance whalers 13—13 comprising two timbers placed one upon the other, extend longitudinally of the form walls exteriorly of the standards or posts 11.

The tie comprises a wire strand or rod 36 which however, if so desired, may be formed as a flat strip, which extends across the space intermediate the form walls 9—10 and between superposed boards thereof, projecting beyond the outer side of the wall boards 9 or 10 as the case may be, and between the superposed whaler members 13—13. The tie rod or strand 36 is formed with integral knobs or upset heads 16 at each end thereof. These knobs or heads 16 are preferably formed by upsetting the ends of the tie strands or rod. To provide a bearing surface of greater extent, collars 17 are positioned upon the tie rod 36 in engagement with the terminal knobs or heads 16. Perforated cross arms or spacer plates 18 are strung upon the tie rods or strands 36 which extend through central perforations thereof. These cross arms or spacer plates 18 are fixedly located upon the tie rods 36 by distorting the rod or strand at opposite sides of the plate or cross arm. These spacer plates or cross arms are adapted to engage the inner faces of the form walls 9 and 10 to limit their approach toward each other. Such spacer

plates or cross arms 18 are not essential although desirable. They may be omitted from the tie strand or rod and in lieu thereof spacer sticks may be interposed between the side walls of the form as is now a quite common practice. The tie rod or strand is of sufficient length to project somewhat beyond the form wall structure.

Adjusting wedges 20 are provided, such wedges being longitudinally slotted or bifurcated at 21 for engagement astride of the projecting portion of the tie rod or strand 36 intermediate the bearing collars 17 and the adjacent faces of the whalers of the form wall structure. These wedges comprise relatively inclined surfaces 24 and 26 terminating in a large end forming a head. The longitudinal slot 21 is provided with a pair of shouldered surfaces 28 inclined with respect to each of the respective surfaces 24 and 26, the channel or slot above the shouldered surfaces 28, as viewed in Fig. 4, being sufficiently wide to accommodate the heads 16 and collars 17. If the space between the collars 17 and the face of the whalers 13 is sufficiently large to use the wedging body found between the tapered surfaces 24 and 26, the surface 24 is placed adjacent the whaler 13, when the collars 17 engage the surface 26 as best seen in Fig. 5. When ply wood is used as shown to the right of Fig. 1, this arrangement of the wedge may be preferable.

When the space between the collars 17 and the face of the whaler 13 is insufficient to accommodate the thickness of the wedge as determined by the surfaces 24 and 26, the wedge may be reversed, as shown to the left in Fig. 1, the collars 17 abutting the shouldered surface 28, which may be accomplished by permitting the oppositely disposed surface 26 to abut the face of the whaler 13. This position of the wedge may be preferable if relatively thick wall boards are used on one side of the concrete.

From the foregoing it may be readily seen that a tie rod having a standard distance between the spacer 18 and the collar 17 may be used both with ply wood and heavier lumber without changing the dimensions of the upright posts or studding 11 and the whalers 13. The same wedge 20 may be used in alternate positions for alternate dimensions. This permits the contractor to use standard dimension wall ties and standard dimension form material of various thicknesses by merely selecting the proper wedging surfaces found upon the wedge to occupy the space intermediate the head or collar 17 and the face of the whaler. In constructions where the material used in erecting the forms varies in dimensions, as may be the case where salvage material is used, standard tie rods may be used, any variations in the material being absorbed by the proper selection of the wedging surfaces, thereby expediting the erection of the forms, reducing the cost thereof, reducing the cost of wall ties in that standard stock material may be used to accommodate various conditions. In the past when various stock material has been used some operations have required two sets of wedges or wall ties made to order which has increased the cost of construction.

In many types of work it is very desirable to present a clean surface that is not marred by the rods broken at the surface. To accommodate this condition the tie rod has been provided with weakened portions 32 and transverse members 34 preventing rotation of the embedded portion of the tie rod 36, which structure permits the twisting of the outer end of the tie rods after the forms have been removed, preferably while the concrete is green, causing the rod to fail at 32, permitting the outer end of the rod to be removed. The hole vacated by the removed portion of the rod may be sealed by a suitable sealing unit, as disclosed in the Carl Kinninger application for U. S. Letters Patent Serial No. 700,207, filed November 29, 1933. The portion of the aperture beyond this sealing unit may be pointed so as to present a smooth unobstructed surface at the face of the finished wall.

While the tie has been illustrated as applied to a common style of concrete form employing longitudinal whaler pieces, it is to be understood that it is not limited to the particular style or construction of concrete forms illustrated but may be applied to any form construction in which it is desired to securely and uniformly connect opposite spaced portions.

Whenever the wedges 20 have been tightened these may be held in position by one or more nails 25 driven through the apertures 38 along the margins of the wedges 20. This prevents the wedges from dropping out of position when the concrete is poured even though vibrators for packing the concrete may be used in shaking the forms, the common, well known practice in present construction.

Instead of the wedges being completely closed around the slot 21 the wedge may consist of a pair of bifurcated portions terminating in the rounded portion at the tapered end of the wedge. The rounded portion can then be omitted as the wedge could be slipped over the end of the rod 36 without passing the head through the rounded portion as now shown.

In addition to transverse members 34 attached to the embedded portion of the rod, members 40 attached to the weakened portion 32 prevents rotation of the rod. Members 40 may constitute bifurcated members having the reduced portion 32 seated in the bight. Either member 34 or members 40 may be omitted, the remaining member or members preventing rotation of the embedded portion.

From the above description it will be apparent that there is thus provided a device of the character described possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportions, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute, the invention has been described in language more or less specific as to structural features, it is to be understood that the invention is not limited to the specific features shown, but that the means and construction herein disclosed comprise the preferred form of several modes of putting the invention into effect, and the invention is therefore claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

Having thus described our invention, we claim:

1. In a wedge for use with a wall tie, a pair of working surfaces disposed angularly to each other, a slot normal to said surfaces and through which the tie may extend, and another working surface normal to the slot and disposed at an angle to at least one of the pair of working surfaces different from the angle between the pair of

surfaces to form a second pair of working surfaces having one working surface in common with the first named pair of working surfaces, the two pairs of working surfaces providing for different degrees of wedging action by like degrees of wedge movement.

2. In a wedge for use with a wall tie, a pair of working surfaces disposed angularly to each other, a slot normal to said surfaces and through which the tie may extend, and another working surface intermediate the pair of working surfaces, said last named surface being normal to the slot and disposed at an angle to at least one of the pair of working surfaces different from the angle between the pair of surfaces to form a second pair of working surfaces having one working surface in common with the first named pair of working surfaces, the two pairs of working surfaces providing for different degrees of wedging action by like degrees of wedge movement.

3. For use with a wall tie having a shoulder, a wedge including a pair of angularly disposed working surfaces, one of which is engageable with the shoulder of the tie and the other of which is engageable with the wall for producing varying degrees of wall adjustment by movement of the wedge relative to the tie shoulder and the wall, and another working surface intermediate the pair of working surfaces and angularly disposed to at least one of the said pair of angularly disposed working surfaces to form therewith a second pair of angularly disposed shoulder and wall engaging working surfaces of different relative angularity than that of the first named pair of working surfaces and selectively positionable between the tie shoulder and the wall whereby to produce different degrees of wall adjustment by a like degree of wedge movement.

4. For use with a wall tie having a shoulder, a wedge including a pair of angularly disposed working surfaces, one of which is engageable with the shoulder of the tie and the other of which is engageable with the wall for producing varying degrees of wall adjustment by movement of the wedge relative to the tie shoulder and the wall, and a shoulder engaging surface angularly disposed to at least one of the said pair of angularly disposed working surfaces to form therewith a second pair of angularly disposed shoulder and wall engaging working surfaces of different relative angularity than that of the first named pair of working surfaces and selectively positionable between the tie shoulder and the wall whereby to produce different degrees of wall adjustment by a like degree of wedge movement.

5. For use with a wall tie having a shoulder, a wedge including a pair of angularly disposed working surfaces, one of which is engageable with the tie shoulder and the other of which is engageable with the wall for producing varying degrees of wall adjustment by movement of the wedge relative to the tie shoulder and the wall, and a shoulder engaging working surface disposed angularly to the shoulder engaging surface of the pair of working surfaces to form therewith a second pair of working surfaces of different relative angularity than the first named pair of working surfaces and selectively positionable between the tie shoulder and the wall whereby to produce different degrees of wall adjustment by like degrees of wedge movement, the shoulder engaging working surface of the first named pair of working surfaces serving as a wall engaging working surface in the second named pair of working surfaces.

ARTHUR M. KINNINGER.
CARL A. KINNINGER.