Nov. 12, 1935. G. F. NEWTON 2,020,515

CONCRETE FORM KEY, TIE AND SPACER

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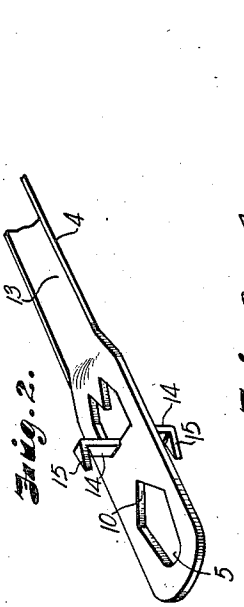


Fig. 2.

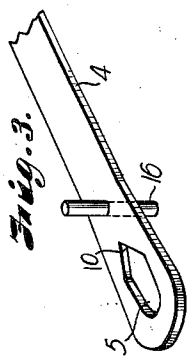


Fig. 3.

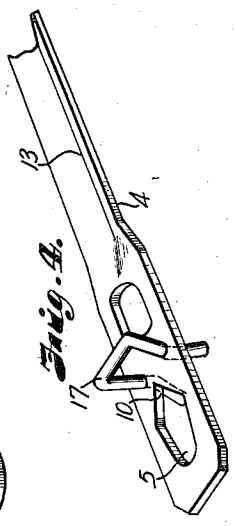


Fig. 4.

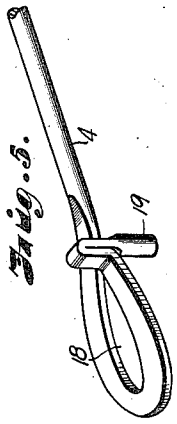


Fig. 5.

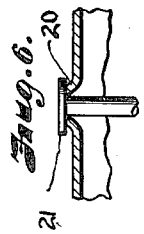


Fig. 6.

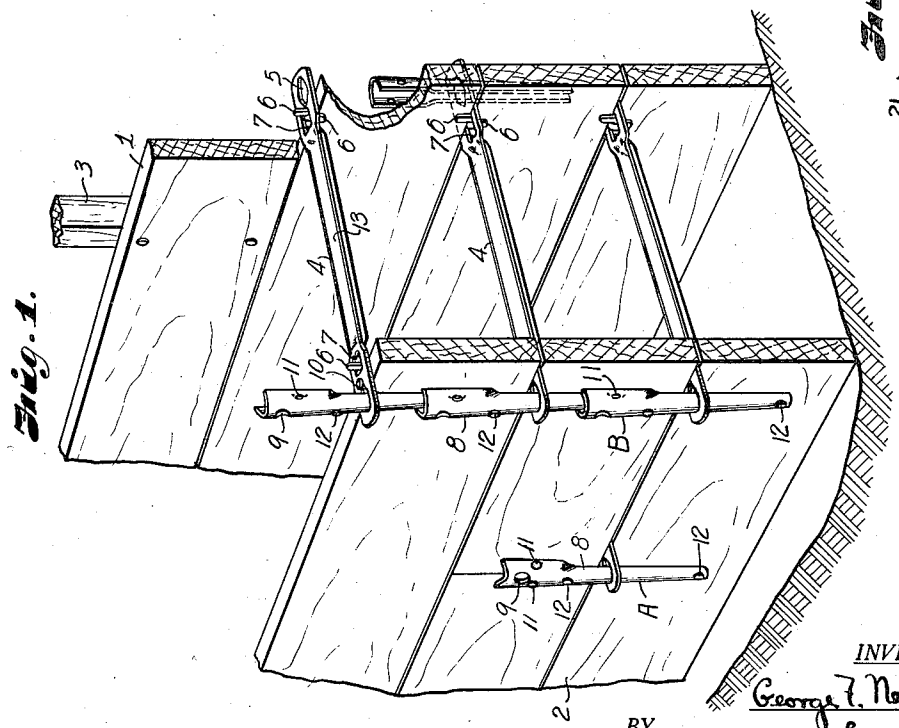


Fig. 1.

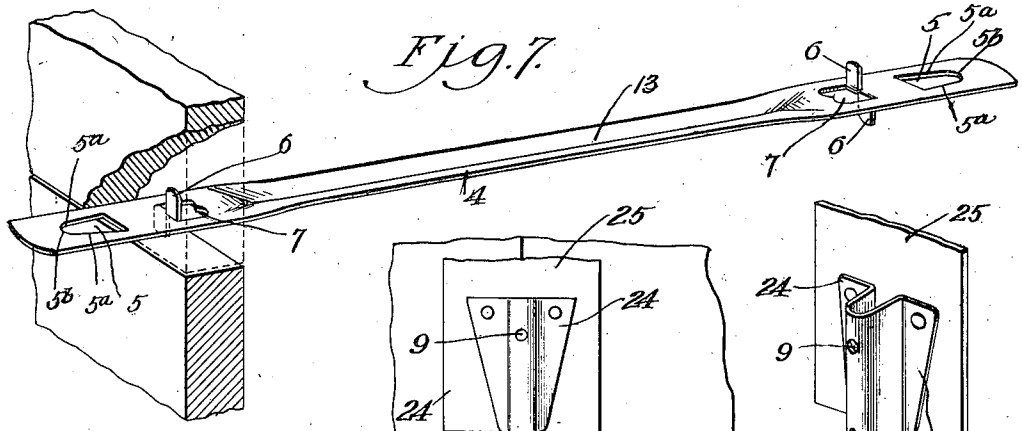
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Fig. 7.



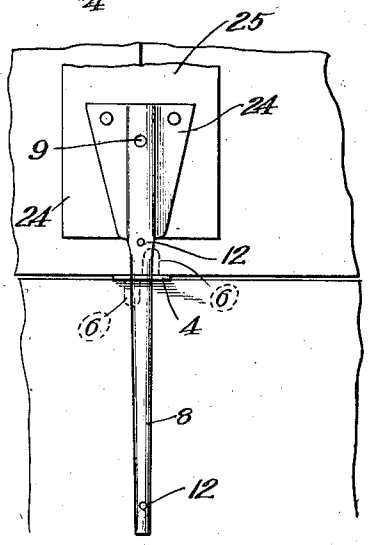


Fig. 8.

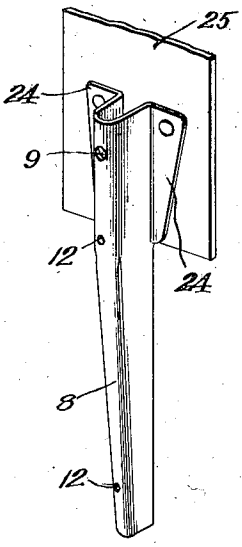


Fig. 9.

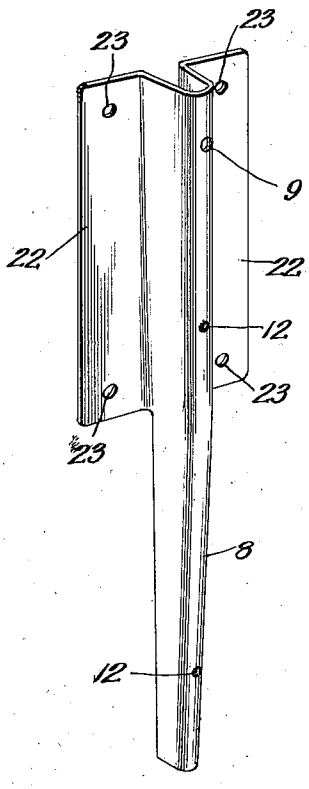


Fig. 10.



Fig. 11.

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UNITED STATES PATENT OFFICE

2,020,515

CONCRETE FORM KEY, TIE, AND SPACER

George F. Newton, Kansas City, Mo.

Application October 21, 1933, Serial No. 694,567

1 Claim. (Cl. 25—131)

This invention relates to concrete form tying devices and is particularly designed for use in the construction of concrete wall forms, either with or without the use of false work construction on both sides of the wall, the device being wedge actuated for simultaneously tying the forms together and spacing them proper distances apart.

Another object of the invention is to produce a construction of the character outlined providing a wedge key which is of such nature that it may be employed to bridge joints between endwise abutting boards to hold them from bulging outwardly or inwardly and to thus avoid special splicing devices of any character at such point.

A further object of the invention is to produce a tie member of the character set forth provided with means for nailing the locking wedges or keys in position, which is particularly advantageous where there is any tendency of the boards to kick upwardly due to warping or the like.

Another object of the invention is to produce a wedge key having a perfectly smooth rounded abutment with the tie to avoid possible cutting of the tie, as frequently occurs when a severed or cut edge is brought into frictional engagement with a tie strap.

A still further object of the invention is to produce a locking wedge of arch form in cross-section and to form the cooperating opening of the tie strap in such manner that improper assembly of the parts is made impossible.

With the general objects named in view and others as will hereinafter appear, the invention consists in certain new and useful features of construction and combination of parts as hereinafter described and claimed; and in order that it may be fully understood, reference is to be had to the accompanying drawings, in which:—

Figure 1 is a perspective view of a form assembly involving the invention.

Figures 2 to 5 are broken perspective views of modified types of combined tie and spacer.

Figure 6 illustrates a method of forming certain nail-receiving openings in certain of the wedge keys.

Figure 7 is a fragmental perspective view of a combined tie and spacer with a board shown in dotted lines to indicate its relation to the wedge-receiving key opening in the tie strap.

Figure 8 is a side elevation of one form of the key wedge in operative relation to endwise abutting form boards.

Figures 9 and 10 are perspective views of modified forms of wedge keys for use in bridging the joint between endwise abutting form boards.

Figure 11 is a perspective view of a modified form of key.

In the said drawings, where like reference characters identify corresponding parts in all of the figures, 1 and 2 respectively indicate opposite sides of a concrete wall form made up of a series of boards of suitable width and spaced apart according to the width of the desired wall, the side 2, as illustrated, being equipped with an external wall support skeleton 3. The wall 1 may be held in position by the ties and spacers hereinafter mentioned without or with other support.

As each board of the form is laid in position, a series of combined ties and spacers 4 are placed along its upper edge, said ties and spacers being formed at their ends with key-receiving openings 5, having outwardly converging side walls 5*a* and a curved end wall 5*b*. Spaced inwardly of the inner end of the opening 5 a distance slightly less than the thickness of the form boards, are oppositely projecting ears 6 to form spacers for the boards, by contact with their inner faces. The pressing out of the ears 6 also forms a concrete receiving opening 7.

The devices are placed along the top edge of each board as the form is assembled with the downwardly extending ears 6 in contact with the inner faces of the form boards, and wedge keys 8 are inserted in said openings 5, the keys being of generally arch form in cross section. The rounded end of the arch comes into engagement with the rounded end of the opening 5, and the ends of the legs of the key are in clamping engagement with the outer faces of the form boards. It is to be noted that as the keys are stamped out of a sheet of metal, the edges are sometimes very sharp. To avoid improper assembly of the keys in the strap openings, the small ends of the keys are preferably so proportioned that when a board is in position as shown in Figure 7, its edge necessarily overlaps the opening 5 to insure a draw-up or clamping action, and the distance between the converging side walls 5*a* of the opening is less than the distance between the legs of the wedge at its smaller end. The operator, therefore, of necessity must place the rounded surface of the key in position to cooperate with the end of the opening 5 in the strap. The keys are also preferably made with sufficient distance between the side legs at the wide end of the wedge to receive and internest with the small end of a superposed wedge. This is to permit vertical alinement of the wedges through the height of a wall, as variations in metal gage and board thickness will permit some wedges to be driven further than

others, before proper clamping pressure is brought on the form walls.

After the parts have been assembled as described, the keys may be hammered home and it will be apparent that this action will tightly clamp the boards between the keys and the ears 6 to simultaneously space and tie the opposite form walls in position. When it is desired to remove the forms, the keys, if they have their lower ends exposed as shown at A in Figure 1, may be hammered at their lower ends to drive them upwardly, or if of hollow construction and arranged in longitudinal alinement as shown at B in Figure 1, with their ends nested, the keys will preferably be equipped at their upper ends with openings 9 for the insertion of a rod or hook to withdraw them from position.

It is to be noted that the hollow construction of the keys is preferable as by the nesting thereof as described they are automatically alined from top to bottom of a wall. This is desirable, particularly on the side of a wall where there is no supporting framework.

In some instances the cracks between the boards in the opposite form walls do not fall in exact horizontal alinement, and consequently the ties being of relatively stiff material, will not rest on the top end of the lower board and will interfere with the ready reception of a superposed board of the side wall. In order to provide means for holding the end of such a tie down on the board, it has been found desirable to form the inner edge of the opening 5 with a V-notch 10, through which a nail may be inserted as shown in Figure 1 to hold the end of the tie down on the edge of the form board, it being apparent that with this construction, as the key is tightened home the nail does not resist the pulling of the key, except by its frictional engagement of its head with the tie. If a separate hole is provided for the nail, it will be evident that the nail body will positively resist tightening of the wedge as it will be in direct shear.

Where boards are in endwise abutment as at A in Figure 1, the type of key there shown may be provided with a pair of holes 11 so that the ends of the boards can be toe-nailed, particularly if there is a tendency for the boards to kick upwardly. In Figures 8, 9 and 10, other means for bridging a vertical joint are shown. The key shown in Figure 10 is formed integrally with oppositely projecting wings 22 formed with nail-receiving openings 23. In Figure 9, the key is provided with small wings 24 to which is riveted a rectangular joint bridging plate 25.

Figure 11 indicates another type of key which is provided with a pair of nail-receiving openings 26 which may be used to tie down vertically warped boards. It will also be noted that the keys are preferably bent out of flat sheets as it has been found that this provides more or less resiliency to act as an absorber for the blow or shock otherwise transmitted to the ties when the concrete is poured into the form. The keys shown in Figures 1 to 6 are also preferably provided with nail-receiving openings 12 for convenience in tying down vertically warped or buckled boards as mentioned above. To stiffen the tie straps they are preferably crimped as shown at 13.

In Figure 2 a slightly modified construction of combined tie and spacer is illustrated, in which the spacing ears 14 are formed with out-turned penetrating points 15 to be embedded in the boards to prevent any tendency of the boards to spread vertically. In Figure 3, the V-shaped notch 10 is clearly shown, this construction instead of having the ears 6 pressed out of the metal of the strap, is provided with a cross pin 16 to answer the same purpose, while in Figure 4, a double cross pin 17 is illustrated together with a concrete receiving opening. In Figure 5, a modified construction formed of wire and bent to provide a loop 18 to receive a key wedge is shown, the end of the wire or rod being reversely bent as at 19 to form the equivalent of the spacing ears of the other modifications.

The nail-receiving openings, as indicated in Figure 6 may be pressed outwardly as at 20 in reversed funnel shape so that the nail head 21 shall be in spaced position for convenient engagement by a nail puller or the like.

From the above description it will be evident that I have produced a construction embodying all of the features of advantage set forth as desirable, and while I have described certain modifications of the invention, it is to be understood that I reserve the right to make all changes within the spirit of the invention and without the ambit of the prior art.

I claim:—

The combination in concrete form construction, of a form, a tie strap having one end projecting through said form and having an opening in such projecting end formed with a semi-circular end wall, the edges of said opening extending from the end wall being in diverging relation, and a key for insertion into said opening and being of wedge shape from end to end and of generally U-shape in cross section, the opening in the strap being of such configuration that it will only receive the small end of the key when the semi-circular wall thereof is in position for cooperation with the corresponding wall of the tie strap.

GEORGE F. NEWTON.