United States Patent

[11] **3,567,171**

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[54] **KEY FORM**
4 Claims, 10 Drawing Figs.

[52] **U.S. Cl.** **249/9,** 25/118, 249/99
[51] **Int. Cl.** **E01c 11/04**
[50] **Field of Search** ..... 94/4, 8.; 249/99, 9, 101, 94, 98, 187, 10, 84; 18/(Rubber Mold Digest); 25/118 (w); 16/126, 127

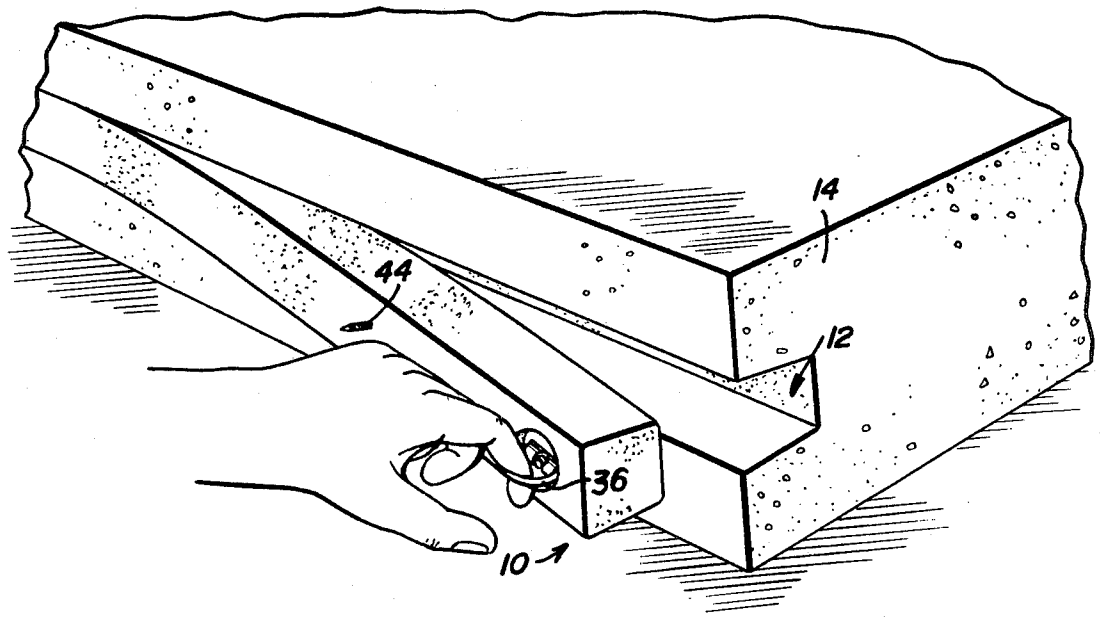
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Primary Examiner—J. Spencer Overholser
Assistant Examiner—Ben D. Tobor
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ABSTRACT: A key form for concrete made of a flexible plastic composition and employed to form a keyway or depression in poured concrete. Removal of the form is facilitated by means of handles flush in the form. A method for forming a keyway includes the nailing of the key form to an inward surface of a concrete form. After removal of the concrete form and subsequent removal of the key form, a keyway is revealed.



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SHEET 1 OF 2

Fig. 1

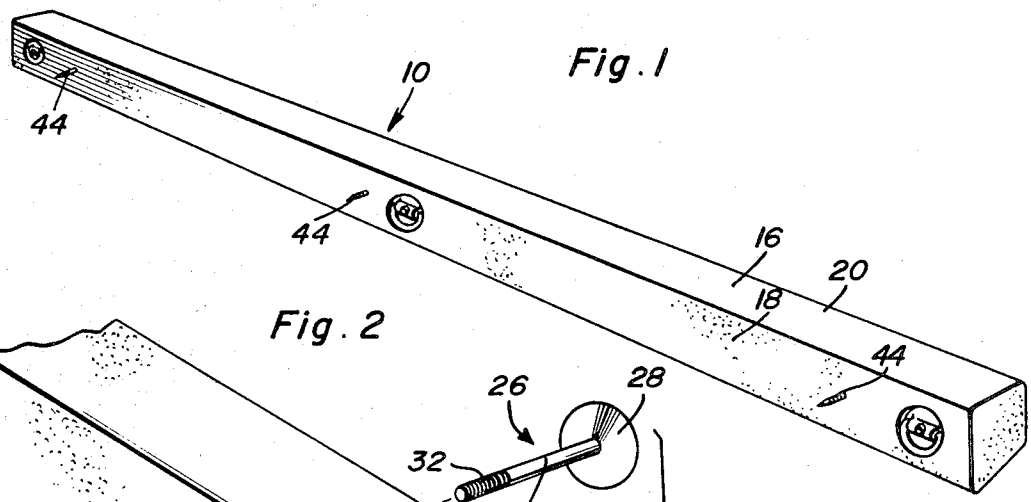


Fig. 2

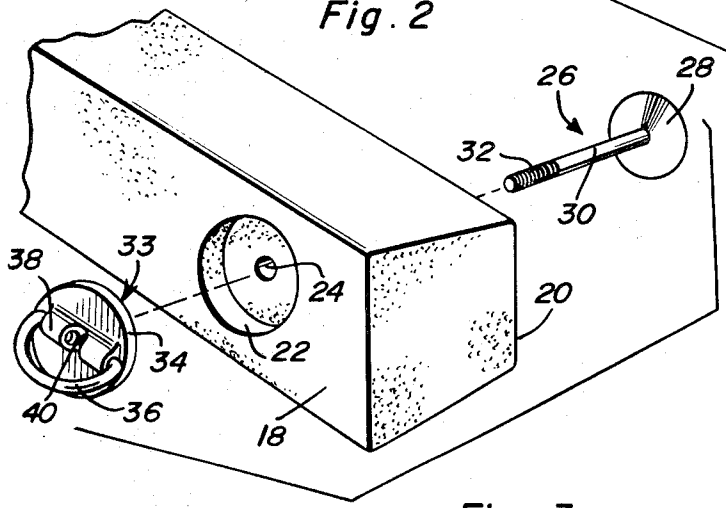


Fig. 3

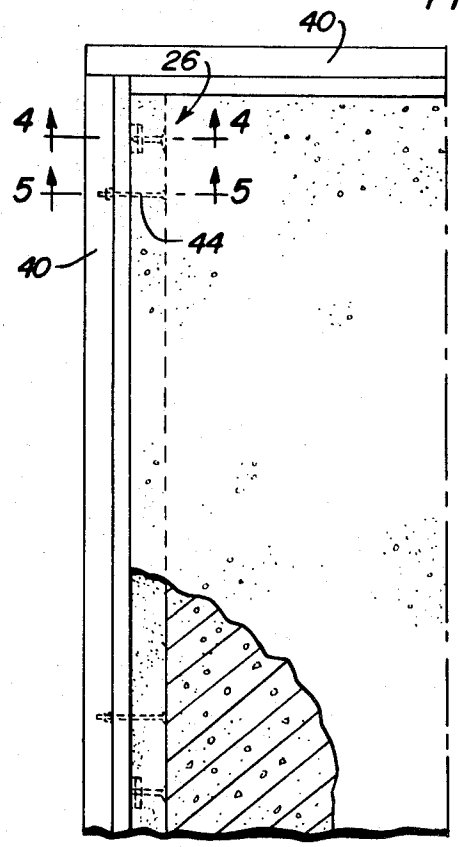


Fig. 4

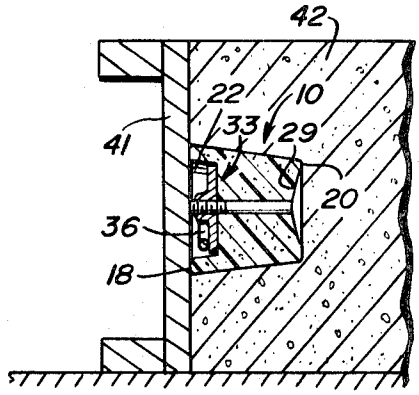
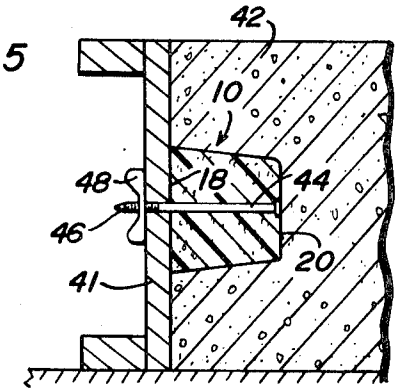


Fig. 5



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Fig. 6

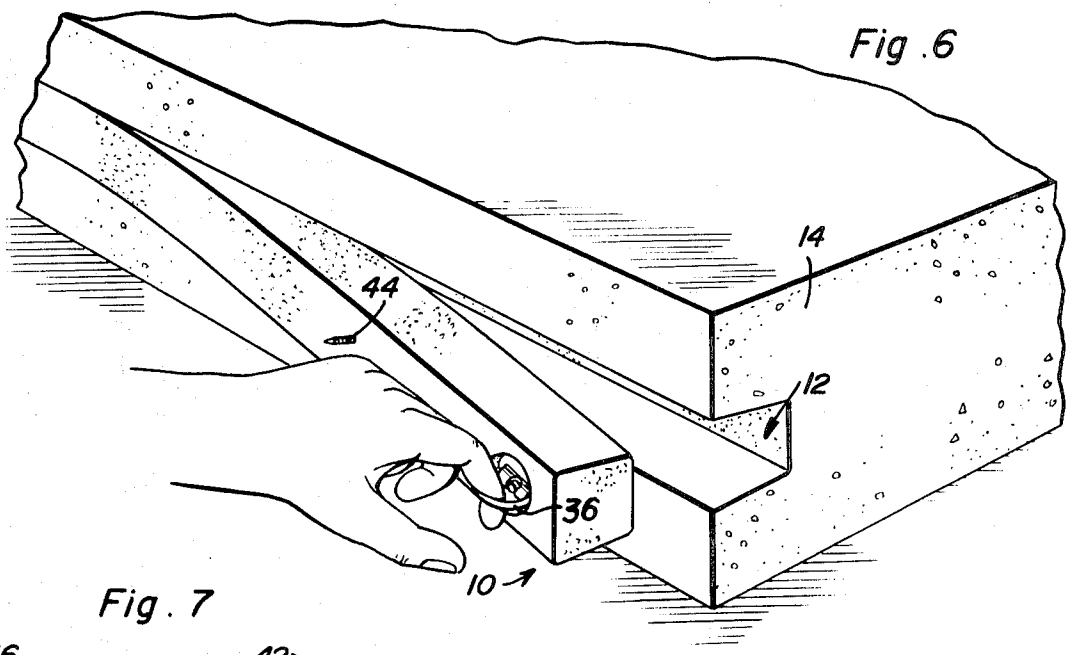


Fig. 7

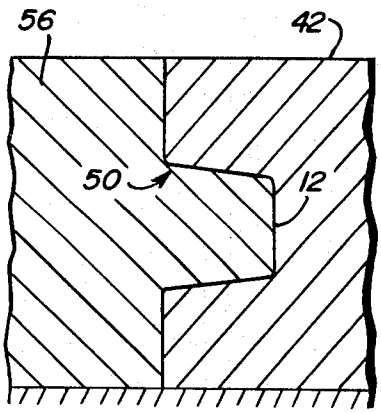


Fig. 8

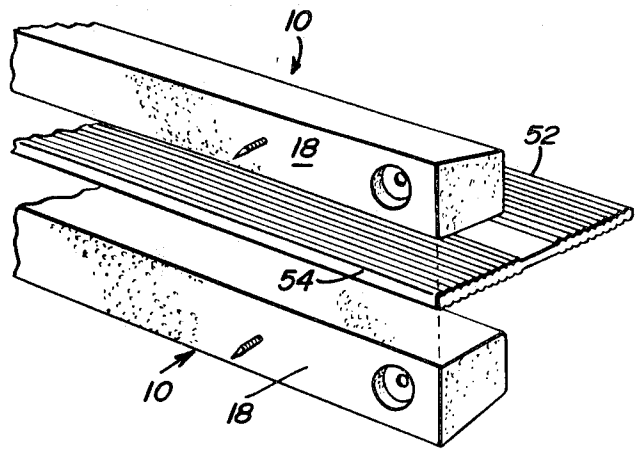


Fig. 9

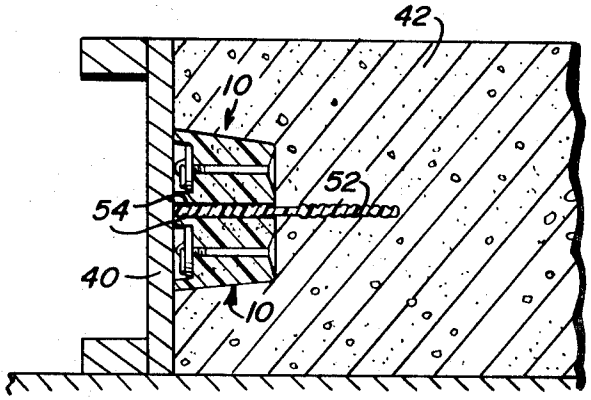
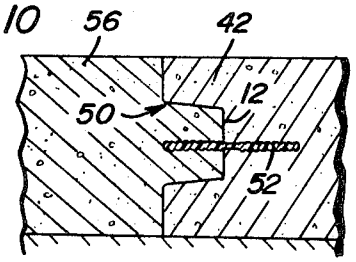


Fig. 10



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KEY FORM

This invention relates to the construction art and more particularly to a form for molding a keyway in poured concrete.

During construction of certain structures, keyed joints between poured concrete members are desired to insure interlocking relation between these members. Heretofore, the construction industry has conventionally utilized rigid key forms around which concrete was poured thereby forming a desired keyway. However, with such a rigid form, there is frequent occurrence of sticking between the hardened concrete and the form thereby necessitating painstaking and costly chiseling to remove the form. As will be appreciated, such a procedure requires the appropriation of man hours resulting in increased cost during the construction project. In addition, the utilization of rigid forms severely restricts their adaptability and ease of removal in minimally accessible areas.

The present invention was designed to fill a long existing need for a practical unit to be used for forming a cavity or recess in poured concrete for the purpose of keying mating concrete or masonry units along an interlocking joint. Such a need arises for example in footings to receive wall structures; stair wells where concrete stairs are to be poured and locked into the walls; on wall structures where masonry or concrete partitions are to be engaged; in concrete floor structures where a section at a time is poured, where said section, of necessity, must have a locking joint; in foundation wall tops; and in surfaces of concrete floors where machine bases will be poured and anchored. The purpose of the present invention is to allow the formation of a keyway by means of a form which is easily and quickly installed and removed. The present key form is fabricated from a flexible plastic composition which may be cut to length with a hand saw or suitable knife, thus decreasing the time-consuming process of cutting form lengths. Utilization of flexible material presents an additional advantage in that the flexibility enables installation of the key form around reinforcing rods and the like. The key form includes flush-mounted pivotable handles or extractors which may be easily installed into the key form thereby doing away with the necessity of drilling holes in concrete forms for receiving protruding handles. Access to the extractors after the concrete has hardened becomes available when removing the concrete form, which is positioned against the surface of the key form accommodating the flush-mounted extractors. By lifting the extractor outwardly, the key form is easily separated from the concrete thereby leaving a desired keyway or cavity.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIG. 1 is a perspective view of the key form of the instant invention.

FIG. 2 is an exploded perspective view illustrating the component portions of the handle device utilized in extracting the key form.

FIG. 3 is a top plan view of the present key form utilized in a concrete form.

FIG. 4 is a vertical cross-sectional view taken along a plane passing through section line 4–4 of FIG. 3.

FIG. 5 is a vertical cross-sectional view taken along the plane passing through section 5–5 of FIG. 3.

FIG. 6 is a partial perspective view illustrating the removal of the present form.

FIG. 7 is a vertical cross-sectional view illustrating a joint capable of being formed by utilizing the present key form.

FIG. 8 is a group perspective view illustrating the insertion of a water stop between vertically aligned key forms.

FIG. 9 is vertical cross-sectional view illustrating the utilization of the assembly shown in FIG. 8.

FIG. 10 is a vertical sectional view showing a keyed joint and water stop installed therein.

Referring specifically to the drawings, and more particularly to FIG. 6, the present form is generally denoted by 10 and is utilized to form a cavity or keyway 12 in a poured concrete slab 14.

As shown in FIG. 1, the form 10 includes an elongated body 16 fabricated from suitable flexible material having a relatively high tensile strength and easily cut with a knife or hand saw. This body has a taper and more particularly a trapezoidal cross section with a first base 18 and a second base 20 of shorter linear dimension than the first base. For purposes of convenience, base 18 will be referred to as the front (surface) of the key form while the second base 20 will be referred to as the rear (surface) of the key form. To facilitate removal, the trapezoidal body is inserted so that the rear or smaller trapezoidal base will form the inward surface of a cavity or keyway.

In order to facilitate manual extraction of form 10 from a formed keyway, flush-mounted longitudinally spaced handles or extractors are recessed within bored cavities 22 formed inwardly of the front surface 18. The center of each cavity communicates with a second bore 24 coaxially extending rearwardly through the key form thereby providing passage means for an extractor anchor denoted by 26 which is seen to include a conical portion 28, the latter being adapted to be recessed within the rear surface 20 of the form. To accomplish this, a conical recess 29 shown in FIG. 4 is preformed in the rear surface of the key form to accommodate each conical portion. Further, each conical portion 28 mounts a stud 30 terminating outwardly in a threaded portion 32. In assembling the key form, the anchor 26 is inserted within bore 24 thereby causing protrusion of the threaded portion 32 into the cavity 22. This later latter mentioned threaded portion 32 permits mounting of an extractor 33 thereon within the cavity 22.

Referring to FIG. 2, each extractor 33 is seen to include a disc body portion 34 having an aperture 40 formed in the center thereof. A pair of coaxial sleeve portions 38 are integrally connected to the disc portion 34 for pivotally mounting a D-ring 36 therein so that the D-ring may be juxtaposed against the disc portion 34 during a keyway-forming operation, yet still allowing the outward extension of the D-ring when manual gripping thereof is required to extract the key form from its associated keyway.

The aforementioned central aperture 40 in the disc portion 34 is threaded to engage and secure the threaded portion 32 of anchor 26.

In order to fasten form 10 to a confronting portion of a concrete form 41, a plurality of spaced nail fastener 44 clearly shown in FIG. 5 are hammered through the key form 10 so that the head of each nail fastener 44 is disposed rearwardly of the key form while an opposite end of the nail fastener protrudes frontwardly. It is noted that this frontwardly protruding portion is threaded to receive a mating fastening member as hereinafter explained.

Referring to FIGS. 3—5, the process for forming a keyway is poured concrete by utilizing the present form 10 is seen to require the nailing of the key form 10 to an inward surface of a confronting concrete form 41. A nail fastener 44 is chosen with suitable length to permit the protrusion of its threaded portion 46 outwardly from the concrete form 41. This permits the mounting of a wing nut 48 or other suitable nut member of on the threaded portion 46 of the fastener 44 thereby increasing the securement of key form 10 to concrete form 41. The addition of the wing nut securement is particularly desirable in application where the key form receive a good deal of abuse. The concrete forms 41 are erected with the key form 10 attached thereto at which time concrete 42 is poured into the concrete forms and allowed to harden.

Attention is directed to FIG. 4 which illustrates the position of the extractor 33 within bored recess 22. The pivotal displacement of D-ring 36, forming part of the extractor 33, permits the flush engagement of the front surface of the key form 10 against the interior surface of concrete form 41. It will be

appreciated that the recessed position of the extractor 33 enables sealing engagement between the front surface of the key form and the concrete form so as to minimize the tendency of concrete, to harden along the front surface 18 of the key form. Thus, a minimum effort is required for peeling or extracting the key form from its associated cavity when the concrete has hardened.

To remove the key form after concrete hardening, the wing nut 48 shown in FIG. 5 is removed from each nail fastener 44 thereby permitting the unfastening of the concrete form 41 from the key form 10. What little hardened concrete occurs along the front surface of the key form is easily chipped away allowing access to the extractors 33. As shown in FIG. 6, the extractor ring 36 is pivotally raised and thereby pulled peeling the key form from the hardened keyway. Although the method employed for such removal illustrates the grasping of the extractor by hand, it is noted that the extraction may be facilitated by means of a suitable lever and fulcrum assembly (not shown). It is further noted that after removal of the key form, it may be immediately utilized in another job because it is durable and reusable.

As shown in FIG. 7, the resulting keyway may serve as a member for a keyed joint 50 connecting a first concrete slab 42 and a second concrete slab 56, the latter being poured after the first slab 42 is hardened so that the keyway 12 becomes filled by poured concrete thereby establishing an interlocking joint along the length of the keyway.

As seen in FIGS. 8—10 of the drawings, a pair of horizontally disposed and vertically aligned key forms 10 are positioned is spaced overlying relation and utilized to retain a beaded conventional water stop 52 between confronting parallel key form surfaces. A formed keyway with the water stop 52 extending therein is shown in FIG. 9 and is formed in the same manner as hereinbefore explained in connection with the formation of a single keyway with the additional step of inserting the forward lateral edge 54 of the water stop in coplanar relation with the front surfaces 18 of the overlying and underlying key forms. The finished product of such a method is shown in FIG. 10 wherein the water stop 52 extends horizontally across the keyway 12 both forwardly and rearwardly thereof so that water is prevented from flowing downwardly through the keyed joint 50 formed by slab 42 associated with keyway 12 and a second poured slab 56 mating with keyway 12.

The foregoing is considered as illustrative only of the principles of the invention. Further since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

I claim:

1. A keyway form adapted for attachment to a concrete form, the keyway form comprising an elongated flexible block having front and rear sides and a tapered transverse cross section, at least one aperture transversely disposed between said front and said rear sides, anchor means retained in each said aperture, at least one recess formed in said front side, handle means mounted on each said anchor means, said handle means being disposed in said recess and adapted for outward pivotal displacement thereby permitting said handle means to be grasped.

2. The structure set forth in claim 1 together with fastener means disposed in said flexible block and extending outwardly from said front side, said fastener means being adapted for attachment to a concrete form so that said concrete form is retained in juxtaposition with the front side of said keyway form, and further wherein said anchor and handle means are separable from said aperture.

3. A form assembly comprising a plurality of keyway forms retained in aligned spaced overlying relation and adapted for attachment to a concrete form, each said form having front and rear sides with a tapered transverse cross section at least one aperture transversely disposed between the front and rear sides of each keyway form, anchor means retained in each said aperture, at least one recess formed in said front side, handle means mounted on each said anchor means and disposed in said recess, said handle means being adapted for outward pivotal displacement thereby permitting the same to be grasped, water stop means disposed between confronting form surfaces in juxtaposition thereto so that one edge of said water stop means is retained in coplanar relation with the front sides of the overlying and underlying keyway forms, and means for retaining said forms and said water stop means in juxtaposition.

4. The assembly set forth in claim 3 wherein said confronting form surfaces are positionable in parallel spaced relation.