March 29, 1932. G. E. GREENWOOD 1,851,356

RETAINER

Filed April 17, 1929

FIG. 1.

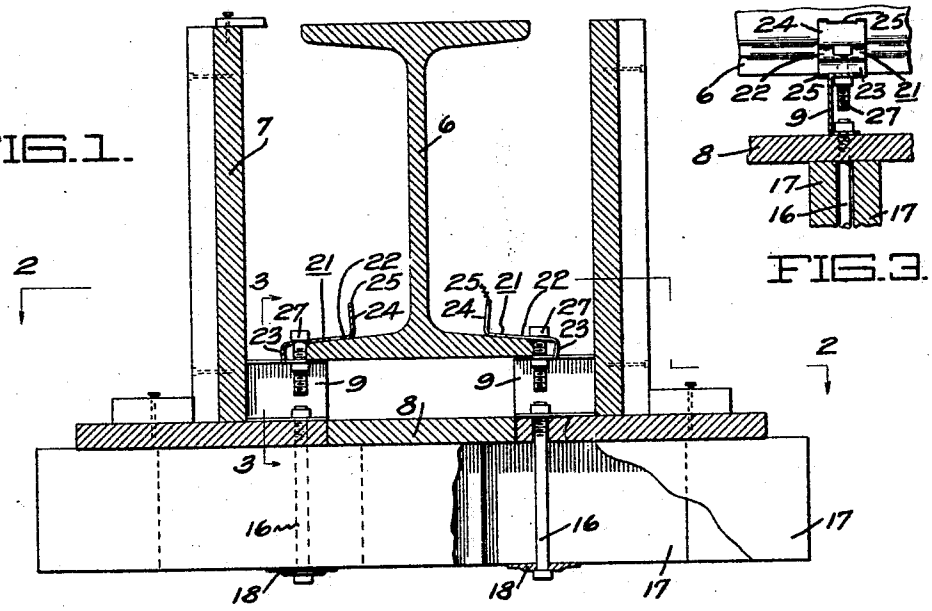


FIG. 3.

FIG. 2.

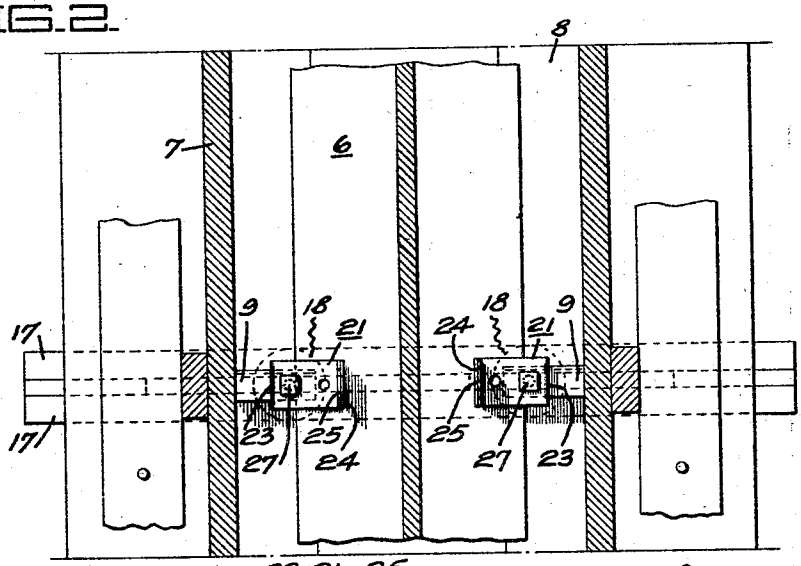


FIG. 5.

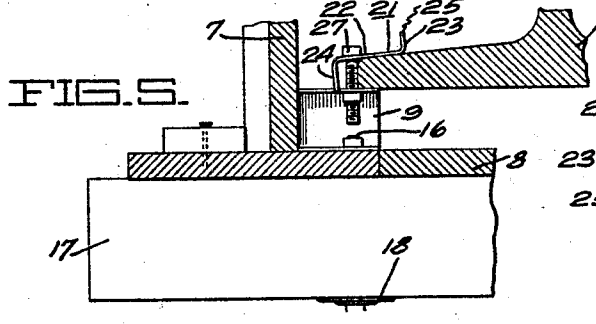
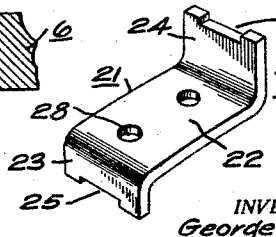


FIG. 4.



INVENTOR:
George E. Greenwood
BY White, Prist & Troyer
ATTORNEYS.

Patented Mar. 29, 1932 1,851,356

UNITED STATES PATENT OFFICE

GEORGE E. GREENWOOD, OF SAN FRANCISCO, CALIFORNIA

RETAINER

Application filed April 17, 1929. Serial No. 355,724.

My invention particularly relates to structures wherein structural beams, such as I beams, are to be retained and then sheathed in concrete. Devices of this general character are also disclosed in my several copending applications,—Serial No. 301,033, filed August 21, 1928 and entitled Concrete form hanger, and application Serial No. 336,097 filed January 30, 1929 and entitled Form hanger.

It is an object of my invention to provide an improved device which will retain a structural beam in a predetermined relationship with a form to which concrete is to be admitted.

Another object of my invention is to provide a device for retaining a concrete form on any one of a wide range of sizes of the beams usually employed commercially in the construction of buildings.

The invention possesses other advantageous features, some of which with the foregoing will be set forth at length in the following description where I shall outline in full that form of the retainer of my invention, which I have selected for illustration in the drawings accompanying and forming part of the present specification. In said drawings I have shown one form of the retainer embodying my invention, but it is to be understood that I do not limit myself to such form since the invention, as set forth in the claims, may be embodied in a plurality of forms.

In the drawings to which I have made reference Fig. 1 is a cross section on a transverse plane of an I beam to which a retainer of my invention has been applied.

Fig. 2 is a cross section through the I beam shown in Fig. 1 along the line 2—2 thereof.

Fig. 3 is a cross section along the line 3—3 of Fig. 1.

Fig. 4 is a perspective view of a retainer of my invention.

Fig. 5 illustrates the use of a retainer of my invention in combination with an I beam of a size different from that indicated in Fig. 1.

In its preferred form, the retainer of my invention comprises a form in which a beam is to be positioned, a spacer provided between the beam and the form, and a retainer adapted to be abutted against the spacer and positioned upon the beam to retain the beam in contact with the spacer irrespective of the flange thickness of the beam used.

In the form of my invention which I have chosen to disclose, there is shown in Fig. 1 an I-beam 6 positioned within a form 7 which is adapted to be filled with concrete to encase the I beam. I have chosen the I beam for purposes of illustration in connection with the retainer of my invention but it is usual, in commercial practice, to use other beams as well as I beams. Furthermore, and this is also true of I beams, the sizes and the wall or flange thickness of the beams vary in accordance with the particular structure and portions of the structure wherein the beam is being used. It is to be enabled to employ a single device for positioning and retaining the beam with regard to a spacer, irrespective of the sizes and thicknesses of the flanges or walls of the beam, that I provide the structure here disclosed.

Preferably disposed between the I beam and floor 8 of the form 7 are spacers 9 which position the beam out of contact with the edges of the form. This is in accordance with the building law and underwriters requirements for the encasement of structural steel members in concrete as a measure of protection against corrosion and fire. The spacers 9 are secured within the form by means of bolts 16 which extend between wooden supporting members 17 through the floor 8 of the form. The ends of the bolts are supported on the opposed edges of the supporting members 17 by washers 18 placed between the heads of the bolts and the wooden supports.

To position and to retain the I beam upon the spacers I preferably provide a member 21 having a central shank 22 upon which an arm 23 and a second arm 24 are positioned at right angles to the major axis and at opposite ends of the shank 22. Means are also provided to position the retainer upon the spacer 9. Thus, as is shown particularly in Fig. 4, notches 25 are cut in the ends of each of the arms 23 and 24. These notches engage the spacer 9 to constrain the retainer against a turning movement on the beam.

As is particularly shown in Fig. 1, in positioning the I beam having the flange thickness there shown, the arm 23 of the member is placed in abutment with the spacers 9, the other end of the member being positioned upon the flange of the beam with the arm 24 upturned. A bolt 27 is then passed thru a hole, indicated as 28, in the member and is made up to retain the member and the arm in position and in abutment with the respective surfaces.

When it is desired to position a beam having a flange thickness greater than that which the arm 23 is adapted to be used with, as is indicated in Figure 1, the member is reversed, as is shown in Fig. 5, the arm 24 being positioned in abutment with the spacers 9 and the other arm being positioned adjacent to the flange of the beam and upturned.

Since it is possible to dispose the arm 23 at various angles to the surface of the spacer with which it abuts, depending upon the thickness of the flange, and since the arm 24 may be likewise disposed at various angles to the spacer, depending upon the thickness of the flange of the beam, it is to be noted that a wide variety and a wide range in flange thicknesses can be successfully engaged by the member 21 by varying the arm positioned in abutment with the spacer. In commercial practice I have found that a single retainer of my invention suffices to accommodate and to secure adequately all sizes and shapes of flanges ordinarily encountered in building construction.

I claim:

1. In combination with a structural beam and a mold form, a retainer comprising a spacer adapted to be adjustably secured between said beam and said form and in contact therewith, and a member adapted to be adjustably secured to said spacer and to be engaged with said beam; said member including a central shank and a pair of arms, one on each end of said shank, said arms being of different lengths and extending in opposite directions and substantially at right angles to said shank.

2. In combination, a structural beam, a mold form having a bottom and a side adjacent said beam, spacing means disposed between said bottom and said beam and abutting said side, a member secured to said spacing means, and a plurality of different arms on said member adapted selectively to be engaged with said spacing means.

3. A retainer comprising a structural beam, a mold form adjacent said beam, a spacer adapted to be disposed between and abutting said beam and said form, a member secured to said spacer, and a pair of arms of different lengths on said member, said member being adapted to be disposed in either of two positions with respect to said beam and said spacer for engaging either of said arms with said spacer.

4. A retainer comprising a structural beam, a mold form adjacent said beam, a spacer disposed between and abutting said beam and said form, and a member adjustably secured to said spacer and adapted to be adjustably supported by said beam, said member including a central shank having an arm extending at substantially a right angle from each end thereof, said arms being of different lengths and extending in opposite directions.

In testimony whereof I have hereunto set my hand.

GEORGE E. GREENWOOD.