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LOCKING SPACER FOR CONCRETE FORMS.

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1,277,612.

Patented Sept. 3, 1918.

Fig. 1.

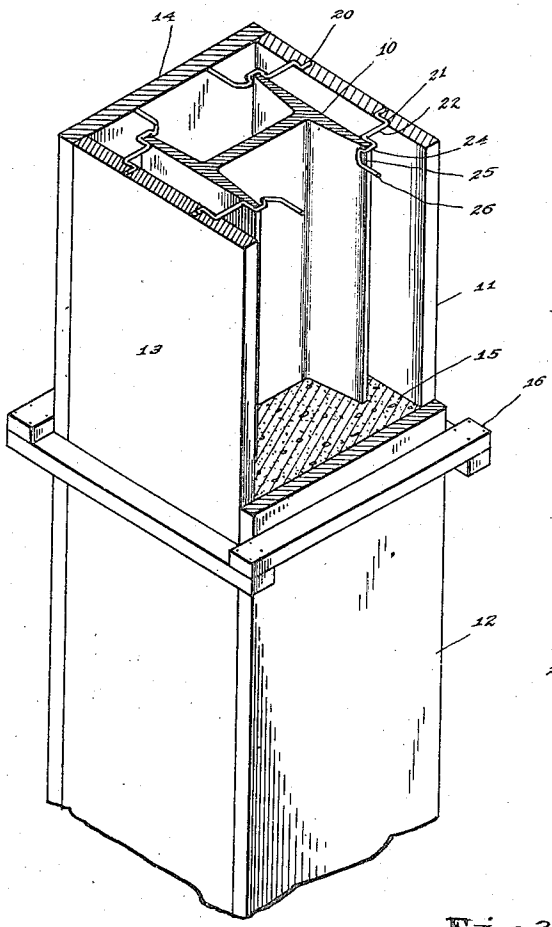


Fig. 2.

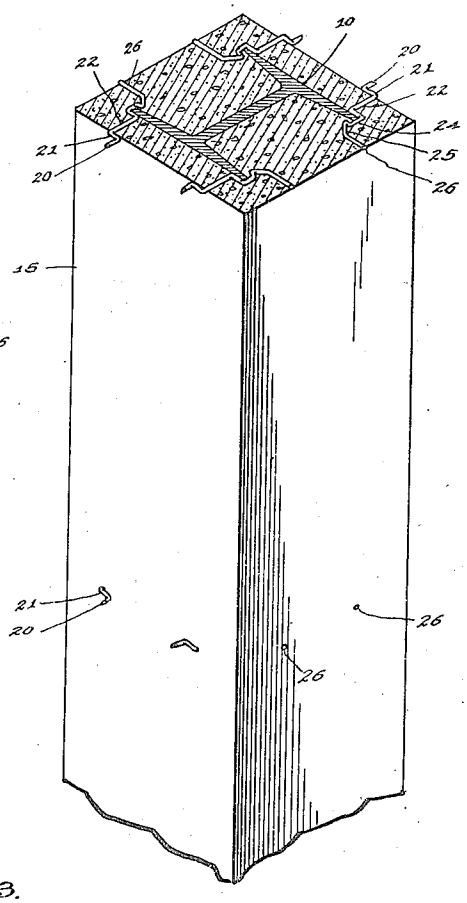
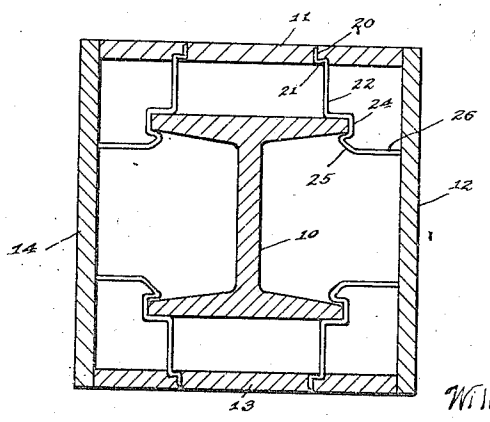


Fig. 3.



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LOCKING-SPACER FOR CONCRETE-FORMS.

1,277,612. Specification of Letters Patent. Patented Sept. 3, 1918.

Application filed November 23, 1917. Serial No. 203,488.

To all whom it may concern:

Be it known that I, WILLIAM B. LEONARD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Locking-Spacer for Concrete-Forms, of which the following is a specification.

It is the object of my invention to provide a locking spacer for structural concrete forms, whereby the forms are properly spaced with relation to each other and to the structural members within the concrete, the forms may easily be put in place with a minimum of labor and that unskilled, the ordinary spacing blocks of wood with their objections are eliminated, and additional reinforcements are provided in the concrete, particularly near the corners; and to do this with a locking spacer which is exceedingly inexpensive.

The accompanying drawing illustrates my invention. Figure 1 is a fragmentary isometric view of the forms for the concrete fireproofing for a structural steel I-beam, showing my locking spacers in operation to space and lock the form parts relatively to each other and to the I-beam; Fig. 2 is a similar fragmentary isometric view of the completed column with the forms removed, showing the locking spacers in place; and Fig. 3 is a horizontal section taken through the I-beam and forms of Fig. 1.

The I-beam or other structural member 10 is suitably supported as a column or beam, and suitably disposed around it are the sides 11, 12, 13, and 14 of the forms for the concrete 15 which is to embed and fireproof the I-beam 10, these form sides being held against each other by any ordinary or suitable clamps 16. The form sides 12 and 14 overlap upon the edges of the form sides 11 and 13, in the arrangement shown.

My improved locking spacers are all alike, and are preferably made of stiff wire having considerable resiliency. Each of them is located in one corner of the space for the concrete column and coöperates with an edge of a flange of the I-beam 10 and with the two form sides (11 and 12, 12 and 13, 13 and 14, or 14 and 10) which coöperate to form such corner. Each locking spacer has a nail-like supporting projection 20 connected to the resilient stem 22 by an offset portion 21 forming a hammering shoulder. This forms a convenient means for attaching the spacer to the form side (11 or 13) parallel to the flange of the I-beam, for by striking with a hammer the shoulder formed by the offset 21, the supporting projection 20 may be driven as a nail into the inner face of such form side. The nail-like portion 20 is substantially parallel to the stem 22, and the offset 21 is bent to a slightly acute angle to both the stem 22 and the nail-like projection 20, as this facilitates driving such projection into the form side. At the free end of the stem 22 the wire of the spacer is bent to form a pocket 24, for fitting over the edge of the flange of the I-beam 10, the side of this pocket joining the stem 22 being deeper than the other side. From the outer end of the shallower side of this pocket so as to lead into the pocket extends an inclined portion 25 which acts as a cam against the flange of the I-beam when the form side 11 or 13 is pushed into place, so that the stem 22 of the spacer may be sprung to permit the pocket 24 to spring over the edge of the I-beam flange. In addition, I prefer to provide at that end of the inclined portion 25 which is remote from the pocket 24 an extension 26 extending substantially at right angles to the stem 22 toward the adjacent form side 12 or 14, so that when such form side is put in place it bears against the end of the extension 26 to lock the pocket 24 over the edge of the I-beam flange.

In use, the locking spacers are suitably attached to the form sides 11 and 13 by having their supporting projections 20 driven in with a hammer until the offset portion 21 is flush with the inner face of the form side. Then these form sides 11 and 13 are placed adjacent to the respective I-beam flanges so that the inclined portions 25 of the locking spacers engage the edges of such flanges; and are forced inward toward the I-beam, the inclined portions 25 serving as cams to spread apart the two locking spacers of each pair, for they are conveniently arranged in pairs as shown, so that the pockets 24 of the two spacers of a pair may spring over the edge of the I-beam flange. Thus the locking spacers may be fastened in place at ease away from the column, and the form sides carrying them may be put in place easily by merely pushing them against the I-beam. Then the form sides 12 and 14 are put up in place, so that they overlap the edges of the form sides 11 and 13; and as they are

thus put in place they engage the ends of the extensions 26 to lock the pockets 24 firmly upon the edge of the I beam flanges. The complete form is then locked by the clamps 16. Then the concrete 15 of the column is poured into the form, so as to embed the I-beam 10 and the locking spacers, and allowed to harden. After the concrete has hardened, the form sides are stripped off, the supporting projections 20 of the locking spacers pulling out from the form sides 11 and 13 and remaining projecting from the concrete, as is clear from Fig. 2. These supporting projections may be readily twisted off by the claws of a claw hammer, leaving exposed the wire end substantially flush with the concrete surface. Similarly, the ends of the projections 26 are substantially flush with the concrete surface, and are substantially invisible. The locking spacers are thus left in the concrete, and serve as additional reinforcements for the corners of the concrete.

I claim as my invention:

1. As an article of manufacture, a locking spacer for concrete forms, comprising a resilient stem provided at one end with a shouldered portion for attachment to a form side so as to be positioned relatively thereto by said shoulder and at the other with a pocket arranged to receive the edge of a structural member to be embedded, and an oblique portion projecting from said pocket on the opposite side thereof from said stem to serve as a cam to spring the spacer to permit the pocket to spring over the edge of the structural member.

2. As an article of manufacture, a locking spacer for concrete forms, comprising a resilient stem provided at one end with an offset projection which may be driven into the inner face of a form side and at the other with a pocket arranged to receive the edge of a structural member to be embedded, said stem and projection being connected by a part forming a shoulder for engaging said inner face, and an oblique portion projecting from said pocket on the opposite side thereof from said stem to serve as a cam to spring the spacer to permit the pocket to spring over the edge of the structural member.

3. As an article of manufacture, a locking spacer for concrete forms, comprising a resilient stem provided at one end with a projection which may be driven into the inner face of a form side and at the other with a pocket arranged to receive the edge of a structural member to be embedded, said stem and projection being connected by a part forming a shoulder for engaging said inner face, and an oblique portion projecting from said pocket on the opposite side thereof from said stem to serve as a cam to spring the spacer to permit the pocket to spring over the edge of the structural member.

4. As an article of manufacture, a locking spacer for concrete forms, comprising a resilient stem provided at one end with a nail-like projection offset from the stem but substantially parallel thereto and connected to the stem by a portion bent to form an acute angle with both the stem and the projection and at the other with a pocket arranged to receive the edge of a structural member to be embedded, and an oblique portion projecting from said pocket on the opposite side thereof from said stem to serve as a cam to spring the spacer to permit the pocket to spring over the edge of the structural member.

5. As an article of manufacture, a locking spacer for concrete forms, comprising a resilient stem provided at one end with a shouldered portion for attachment to a form side so as to be positioned relatively thereto by said shoulder and at the other with a pocket arranged to receive the edge of a structural member to be embedded, and an oblique portion projecting from said pocket on the opposite side thereof from said stem to serve as a cam to spring the spacer to permit the pocket to spring over the edge of the structural member, the side of said pocket from which said oblique portion leads being of less height than the side toward said stem.

6. As an article of manufacture, a locking spacer for concrete forms, comprising a resilient stem provided at one end with a portion for attachment to a form side and at the other with a pocket arranged to receive the edge of a structural member to be embedded, an oblique portion projecting from said pocket on the opposite side thereof from said stem to serve as a cam to spring the spacer to permit the pocket to spring over the edge of the structural member, and an extension from the free end of said oblique portion transverse to said stem for engagement with another form side to lock the pocket in place on the edge of said structural member.

7. As an article of manufacture, a locking spacer for concrete forms, comprising a resilient stem provided at one end with a portion for attachment to a form side and at the other with a pocket arranged to receive the edge of a structural member to be embedded, an oblique portion projecting from said pocket on the opposite side thereof from said stem to serve as a cam to spring the spacer to permit the pocket to spring over the edge of the structural member, and an extension transverse to said stem for engagement with another form side to lock the pocket in place on the edge of said structural member.

8. As an article of manufacture, a lock-

ing spacer for concrete forms, comprising a resilent stem provided at one end with a portion for attachment to a form side and at the other with a pocket arranged to receive the edge of a structural member to be embedded, and an extension transverse to said stem for engagement with another form side to lock the pocket in place on the edge of said structural member.

9. In combination, a form side, a pair of spring locking spacers attached to the inner face of said form side and provided with stems having pockets for gripping the edges of a structural member to be embedded, with springing cams leading to said pockets, and with extensions substantially parallel to said form side, and a pair of adjacent form sides transverse to the first form side and engaging the ends of said projections.

10. In combination, a form side, a pair of spring locking spacers separably attached to the inner face of said form side and provided with stems having pockets for gripping the edges of a structural member to be embedded, with springing cams leading to said pockets, and a pair of adjacent form sides transverse to the first form side.

11. As an article of manufacture, a locking spacer for concrete forms, formed of a single piece of spring wire, said wire being bent so that there are an intermediate portion constituting a resilent stem, a nail-like projection offset from the stem at one end of the latter and connected thereto by a portion which forms both a hammering head for driving the nail-like projection into a form side and a positioning member for engaging the face of the form side to limit the depth of driving, a pocket formed at the other end of said stem for receiving the edge of a structural member to be embedded, an oblique portion leading to said pocket on the opposite side thereof from said stem to serve as a springing cam cooperating with the edge of the structural member when putting the parts in place, and an extension from the pocket end of said wire for engaging another form side to lock the pocket on the edge of the structural member and position said last form side relative to said edge.

12. As an article of manufacture, a locking spacer for concrete forms, formed of a single piece of spring wire, said wire being bent so that there are an intermediate portion constituting a resilent stem, a nail-like projection offset from the stem at one end of the latter and connected thereto by a portion which forms both a hammering head for driving the nail-like projection into a form side and a positioning member for engaging the face of the form side to limit the depth of driving, a pocket formed at the other end of said stem for receiving the edge of a structural member to be embedded, and an oblique portion leading to said pocket on the opposite side thereof from said stem to serve as a springing cam coöperating with the edge of the structural member when putting the parts in place.

In witness whereof, I have hereunto set my hand at Indianapolis, Indiana, this 20th day of November, A. D. one thousand nine hundred and seventeen.

WILLIAM B. LEONARD.