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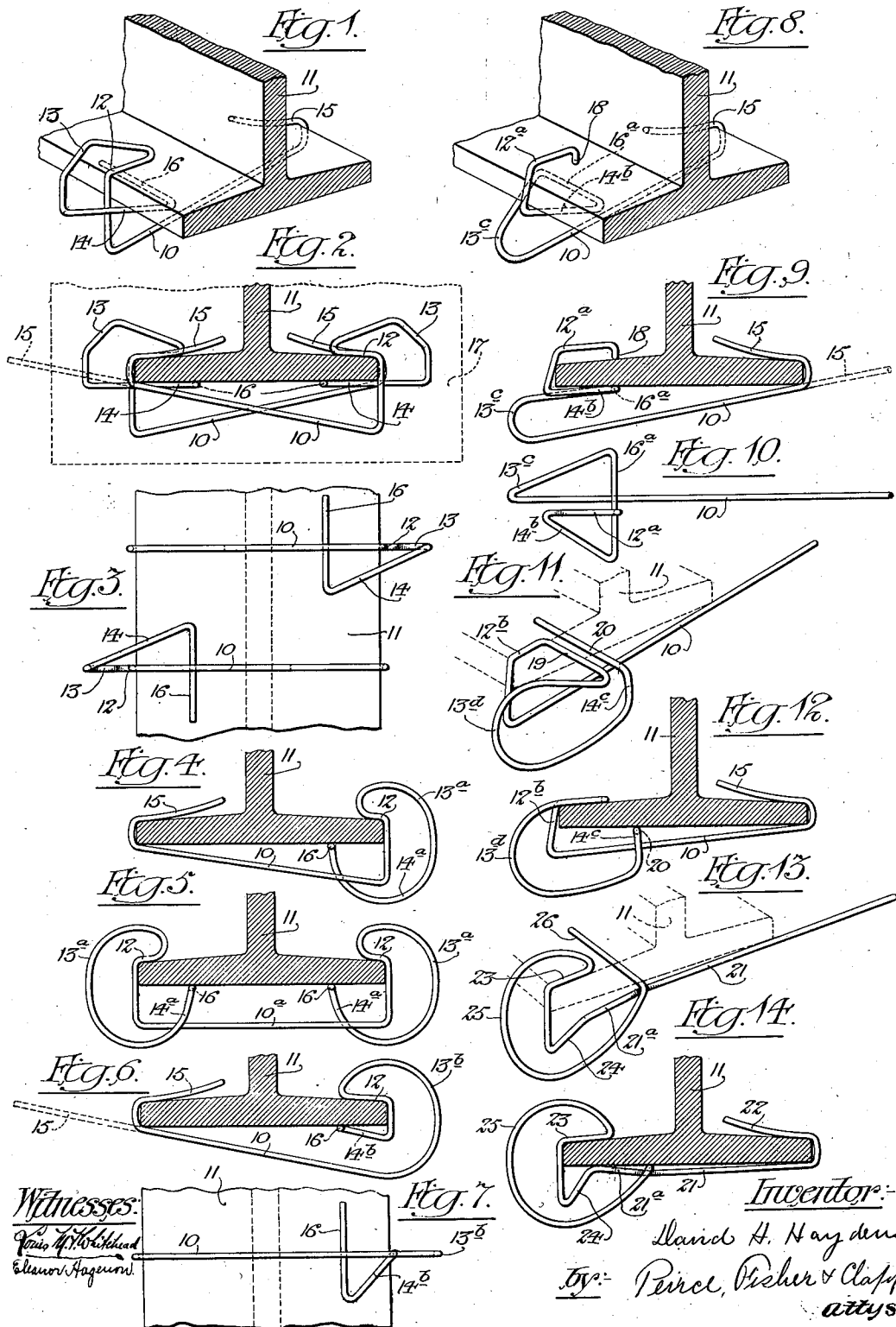
REINFORCEMENT FOR THE COMPOSITION COVERING OF STRUCTURAL MEMBERS.

APPLICATION FILED DEC. 4, 1912.

1,156,030.

Patented Oct. 5, 1915.

2 SHEETS—SHEET 1.



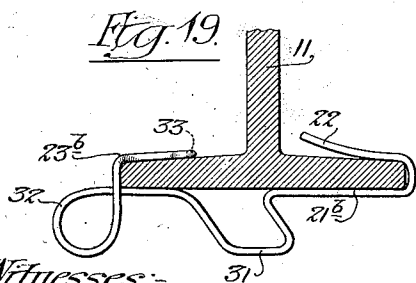
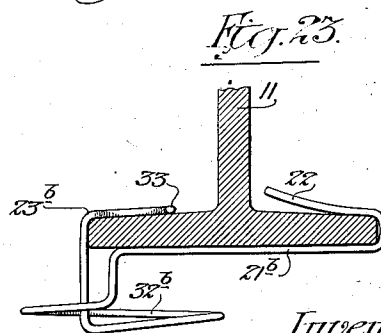
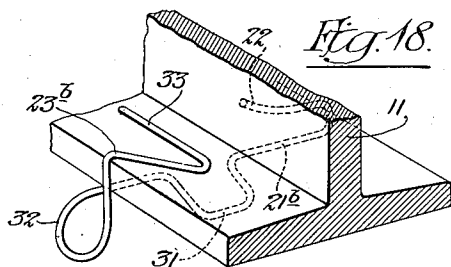
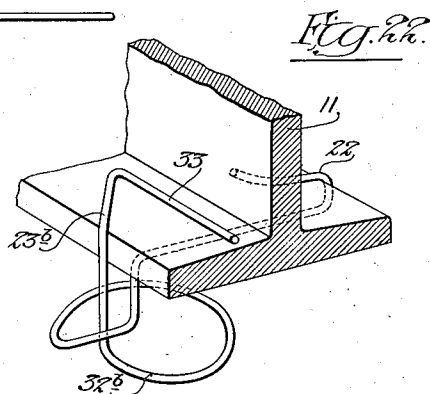
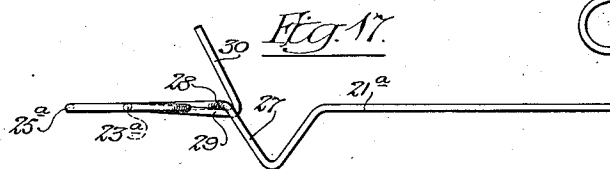
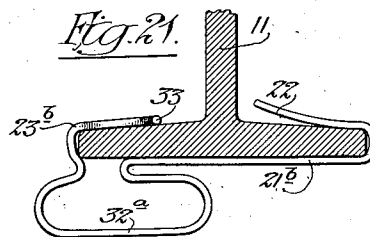
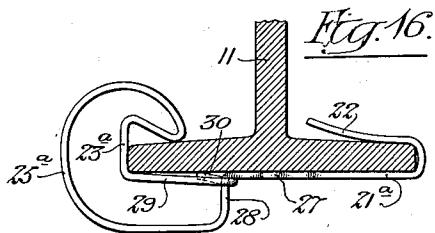
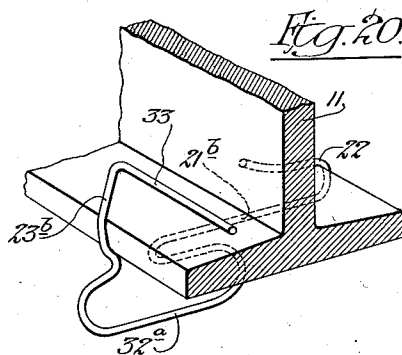
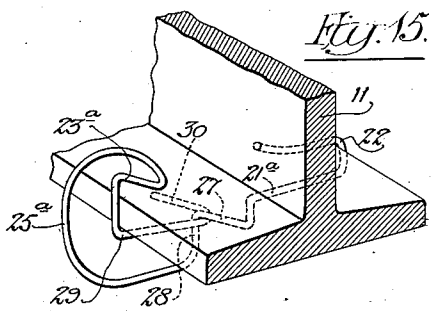
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UNITED STATES PATENT OFFICE.

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REINFORCEMENT FOR THE COMPOSITION COVERING OF STRUCTURAL MEMBERS.

1,156,030.

Specification of Letters Patent.

Patented Oct. 5, 1915.

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To all whom it may concern:

Be it known that I, DAVID H. HAYDEN, a citizen of the United States, and a resident of New York, county and State of New York, have invented certain new and useful Improvements in Reinforcements for the Composition Covering of Structural Members, of which the following is a full, clear, and exact description.

The invention relates to reinforcements for the composition covering of structural members, beams and the like, and seeks to provide an improved reinforcement comprising individual elements which are economically formed of wire and are adapted to be separately applied to the beam.

The invention also seeks to provide an improved form of single wire reinforcing element which can be conveniently and quickly applied to the beam and which is provided with means for holding the reinforcing portions thereof in proper offset relation with respect to the surface of the beam and which is also provided with means for holding the reinforcing element against tipping.

The invention consists in the features of improvement hereinafter set forth, illustrated in different forms in the accompanying drawings and more particularly pointed out in the appended claims.

In the drawings, Figure 1 is a perspective view of the lower portion of an I-beam with one form of the improved reinforcing element applied thereto. Fig. 2 is a cross-section of the lower portion of an I-beam showing two of the reinforcing elements, similar to that shown in Fig. 1, applied to the opposite edges of the lower beam flange. Fig. 3 is an inverted plan view of the parts shown in Fig. 2. Figs. 4, 5 and 6 are cross-sections of the lower portion of an I-beam with different forms of the invention applied thereto. Fig. 7 is an inverted plan view of the parts shown in Fig. 6. Fig. 8 is a perspective view and Fig. 9 is a cross-section of an I-beam with another form of the invention applied thereto. Figs. 10 and 11 are plan and perspective views, respectively, of a further modification. Fig. 12 is a cross-section of the lower portion of an I-beam with the form of reinforcing element shown in Figs. 10 and 11 applied thereto. Figs. 13 and 14 are views similar to Figs. 11 and 12, respectively, showing a further modification of the invention. Figs.

15 and 16 are views similar to Figs. 11 and 12, showing another form. Fig. 17 is a plan view of the form of reinforcing element shown in Figs. 15 and 16. Figs. 18 and 19 are views similar to Figs. 11 and 12, respectively, showing another form of the invention. Fig. 20 is a perspective view and Fig. 21 is a cross-section illustrating a further modification. Figs. 22 and 23 are similar views illustrating another form.

The improved reinforcing elements are preferably formed of round, soft annealed wire which can be bent to form the attaching and reinforcing portions of the individual elements. Each reinforcing element is adapted to be separately applied to the structural member, beam or the like, and for this purpose, each element comprises a cross-stay having an integral portion at at least one of its ends which is bent to form an attaching jaw. This attaching jaw is arranged to embrace one edge of the flange of the beam, while the opposite end of the cross-stay is extended, so that it may be bent around the opposite edge of the beam flange to hold the reinforcement in position. The reinforcement is also provided with an integral part which extends transversely on opposite sides of the plane of the cross-stay or in a direction longitudinally of the beam and which part is adapted to engage the face of the beam to hold the individual reinforcement element against tipping.

The improved reinforcing element is particularly adapted for securely anchoring the portion of the composition covering which extends over the face and around the edges of the flanges of the structural member or beam. In the form shown in Figs. 1, 2 and 3, as in the other forms, each reinforcing element is formed of a separate length of wire and is adapted to be separately secured to the beam. Each of these reinforcing elements comprises a cross-stay 10 which is adapted to extend across the lower face of the I-beam 11 at an angle thereto. One end of the length of wire forming the reinforcing element is bent to form an attaching hook 12, a reinforcing loop 13 and a spacing member 14. The bent portion forming the hook 12 extends upwardly from the lower end of the cross-stay 10, is adapted to abut against one edge of the base flange of the I-beam and to extend inwardly over the flange and engage the inner face thereof. The integral reinforcing loop portion ex-

tends outwardly and upwardly from the inner end of the hook 12 and then outwardly and downwardly to the inwardly extending spacing member 14. The spacing member 14 extends inwardly and engages the outer face of the base flange of the I-beam. The hook 12 and the spacing member 14 form an attaching jaw which is adapted to embrace one edge portion of the flange of the beam with the jaw members engaging the inner and outer faces thereof to thereby hold the reinforcing loop 13 and the adjacent end of the cross-stay 10 in predetermined, offset relation from the surfaces of the beam. The opposite end of the cross stay is provided with an extension 15 which, before the reinforcing element is applied to the beam, is in line therewith, as indicated in dotted lines in Fig. 2.

In applying the reinforcement to the beam; the members of the jaw at one end of the cross-stay are placed in engagement with one edge of the flange of the beam and the opposite extended end 15 of the cross-stay is then bent around the opposite edge, as clearly shown in full lines in Fig. 2. The individual reinforcing elements are separately applied to the beam with the similar ends of the adjacent cross-stays alternately engaging the opposite edges of the base flange, as indicated in Figs. 2 and 3. Inasmuch as the individual elements are separately supported from the flange, it is necessary to provide means for holding the same against tipping to one side or the other and, for this purpose, the spacing element or jaw member 14 is provided with an integral part 16 which extends transversely of the cross-stay and on opposite sides of the plane thereof, and preferably in a direction extending longitudinally of the beam. This cross-stay abuts against the outer face of the flange of the beam and securely holds the other portions of the reinforcing element in a plane at right angles to the length of the beam, so that the reinforcing portions thereof will be maintained in proper offset relation and will not be tipped or canted out of position as the composition covering 17 (indicated by dotted lines in Fig. 2) is applied. It should be noted that the jaw member or portion 14 is inclined to the plane in which the main portions of the reinforcing elements are located, so that the transverse part or brace 16 extends on opposite sides of this plane to securely hold the brace against tipping in either direction. The separate reinforcing elements are applied to the beam at proper distances apart with the jaw portions of the adjacent stays alternately applied to the opposite edges of the beams, so that the adjacent cross-stays 10 are oppositely inclined as shown in Fig. 2. The stays serve to reinforce the portion of the concrete covering which extends over the lower face of the

beam flange and the loop portions 13 serve to reinforce that part of the covering which extends about the edges of the flange. The improved reinforcing elements can be quickly applied to the beam by hooking the jaw over one edge of the beam flange and bending the extension 15 about the opposite edge. When so applied, the reinforcing element is securely held in proper position.

The form shown in Fig. 4 is similar to that shown in Figs. 1, 2 and 3, except that the reinforcing portion 13^a is of curved instead of angular outline and the part 14^a is also curved so that it is held in offset relation from the adjacent portions of the beam. Its inner end and the transverse brace or part 16, however, abut against the face of the beam to properly hold the reinforcement in position. In the form shown in Fig. 5, both ends of the reinforcing element are provided with attaching jaws similar to that shown at one end of the form illustrated in Fig. 4, and it is not adapted to be secured in place by bending one end of the cross-stay around one edge of the beam flange. This form, instead of being made of soft annealed wire, is made of hard wire which is somewhat resilient, so that the hooked portions 12 of the jaws at the opposite ends of the cross-stay can be sprung over the edges of the beam flange to hold the reinforcement in position. Of course, in this form the cross-stay 10^a is arranged parallel to the face of the beam instead of at an incline thereto.

The form shown in Figs. 6 and 7 is similar to those already described, except that the reinforcing portion 13^b extends from the adjacent end of the inclined cross-stay 10 to the inner end of the attaching hook 12 and the outer jaw member 14^b extends inwardly from the vertical portion of the attaching hook.

In the form shown in Figs. 8, 9 and 10, the curved portion 13^c extends from the adjacent end of the cross-stay 10 to one end of the transverse brace or part 16^a. The attaching hook or inner jaw member 12^a is formed at the end of the length of wire and is provided with a down-turned inner end 18 which abuts against the inner face of the beam flange to thereby hold the main portion of the attaching hook in offset relation.

In the form shown in Figs. 10 and 11, the hook 12^b is provided at its inner end with a transversely extending part or brace 19. A curved reinforcing portion 13^a extends from the end of the part 19 and terminates in an upwardly extending portion 14^c which is adapted to abut against the outer face of the beam. The part 14^c is provided with a transverse extension or brace 20. The transverse braces 19 and 20 extend in opposite directions from the plane of the reinforcing element and in a direction longitudinally of

the beam. These braces engage the opposite faces of the beam flange and effectively hold the reinforcing element against tipping.

In all forms thus far described, the cross-stay of the reinforcing element is adapted to be held in offset relation from the face of the beam to thereby aid in anchoring the composition covering to the beam. In the other forms shown, the cross-stay is adapted to lie against the face of the beam and the anchoring of the covering in position is effected by other offset portions. In the form shown in Figs. 13 and 14, the cross-stay 21 has an extension 22 at one end which is adapted to be bent around one edge of the beam. At its opposite end, the reinforcing element is provided with an integral attaching hook 23 which, in connection with the adjacent end of the cross-stay forms an attaching jaw. Preferably, the vertical portion of the hook is adapted to extend downwardly some distance below the face of the beam and is connected to the adjacent end portion of the cross-stay by an inclined part 24. Preferably, as shown, the adjacent end portion 21^a of the cross-stay is laterally offset to a slight extent. A curved reinforcing element 25 extends from the inner end of the hook 23 and is adapted to extend about the edge of the beam flange in offset relation thereto to anchor the composition covering to the beam. The end of the reinforcing portion 25 hooks over the cross-stay and is provided with a transverse member or brace 26 which is adapted to extend in a direction longitudinally of the beam and abut against the outer face thereof. The brace 26 and the portion 21^a of the cross-stay hold the reinforcing element against tipping.

In the form shown in Figs. 15, 16 and 17, the cross-stay 21^a is provided with a laterally offset, V-shaped part 27 which terminates in a downwardly extending portion 28. The curved reinforcing portion 25^a extends from the end of the vertical portion 28 to the inner end of the attaching hook 23^a. The end of the hook is adapted to engage the inner face of the beam flange, but the vertical portion thereof extends above this face, as shown. At its lower end, the vertical portion of the hook terminates in an inwardly extending portion 29 which is hooked around the vertical portion 28 and is provided with a laterally extending part or brace 30. The parts 27 and 30 engage the lower face of the beam and hold the reinforcing portion 25 in proper position and in a plane at right angles to the length of the beam.

In the form shown in Figs. 18 and 19, the transverse brace 21^b is provided with a depending, U-shaped, reinforcing portion 31 and a closed reinforcing loop 32 extends from the end of the cross stay to the hook member 23^b. The horizontal portion of the

hook member is inclined to the vertical plane in which the reinforcing element is arranged and terminates in a transverse brace 33 which engages the inner face of the beam flange to hold the reinforcing element in proper position. The reinforcing element shown in Figs. 20 and 21 is similar in construction, except that the reinforcing part 31 is omitted and the end of the cross-stay is connected to the hook 23^b by a laterally elongated reinforcing loop 32^a. The form shown in Figs. 22 and 23 is also similar, except that in this form the reinforcing loop 32^b is arranged in a plane parallel to the outer face of the beam and is not disposed at right angles thereto, as in the forms previously described.

In all the forms shown, except in Fig. 5, one end of the reinforcing element is provided with an attaching jaw arranged to engage one edge of the beam flange and the other extended end of the stay is adapted to be bent around the opposite edge or flange to hold the reinforcing element in position. It should be understood that all of these forms are adapted to be applied to the beam with the similar portion of adjacent stays of the series in reverse position. That is to say, with the attaching jaw portions of adjacent stays in engagement with the opposite edges of the flange of the structural member or beam.

It is obvious that numerous changes may be made in the details of the improved reinforcing element without departure from the essentials of the invention as defined in the claims.

I claim as my invention:—

1. A reinforcing element for the composition covering of structural beams and the like, comprising an individual wire cross stay adapted to be connected at one end to one edge of the beam and having an integral jaw at one end for engaging the flange at the opposite edge of the beam, said cross stay having reinforcing portions and one of the jaw portions thereof having an integral brace portion offset from said reinforcing portions and extending transversely of the cross stay, said brace portion being arranged to engage the beam and hold the reinforcing element against tipping with the reinforcing portions thereof in predetermined offset position relatively to the beam, substantially as described.

2. A reinforcing element for the composition covering of flanged structural beams and the like, comprising a cross stay formed of a single length of wire having one end portion bent to form attaching jaws adapted to embrace one end of the beam flange, the opposite end of the length of wire being bendable around the opposite edge of the beam flange to secure the stay in position, said wire stay having integral reinforcing

portions and a portion of the length of the wire forming said stay being bent to form a brace offset from said reinforcing portions and arranged transversely of the main body of the stay, said brace being arranged to engage the beam to hold the cross stay against tipping and the reinforcing portions thereof offset from the face of the beam.

3. The combination with a structural beam, of a reinforcement for the composition covering thereof comprising a series of separate independent elements, each comprising a single wire cross-stay having integral end portions hooked over the opposite edges of the beam, each of said wire cross-stays having an integral reinforcing portion offset from the face of the beam, and a portion of the length of wire forming the cross stay being bent to form a brace extending transversely of the main portion of the stay and arranged to engage the beam to hold the individual element against tipping, substantially as described.

4. The combination with a structural beam, of a reinforcement for the composition covering thereof comprising a series of separate independent elements, each comprising a single wire cross-stay having one end bent around one edge of the beam and its opposite end bent to form an attaching jaw, the members of which embrace the opposite edge portion of the beam, each of said wire cross-stays having integral reinforcing portions offset from the face of the beam, and the portion of the length of wire forming each stay being bent to form an integral brace extending longitudinally of the beam and engaging the same to hold the individual element against tipping, substantially as described.

5. The combination with a structural flanged beam, of a reinforcement for the

composition covering thereof comprising a series of separate independent elements, each comprising a cross-stay having one end bent around one edge of the beam flange and an integral, offset portion at its opposite end bent to form an attaching jaw which is spaced from the main portion of the stay and the members of which embrace the opposite edge portion of the beam flange and engage the opposite faces thereof to hold the adjacent end of the cross-stay in predetermined offset relation to the face of the beam, and one of said jaw members having an integral brace extending transversely of and on opposite sides of the plane of the cross-stay and arranged to engage the beam to hold the individual reinforcing element against tipping, substantially as described.

6. A reinforcing element for the composition covering of structural flanged beams and the like, comprising a single wire cross-stay having an integral, offset loop at one end, portions of which are bent to form an attaching jaw having members arranged to receive one edge of the beam flange between them and engage the opposite faces of the flange and hold the adjacent end of the cross-stay offset from the face of the beam, the other end of the stay being bendable about the opposite edge of the beam flange to secure the reinforcing element in position, one of the members of said attaching jaw having an integral brace extending transversely on opposite sides of the plane of the cross-stay and arranged to engage the face of the beam flange and hold the reinforcing element against tipping, substantially as described.

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