May 30, 1939. A. I. SYAK 2,160,345

STRUCTURAL STEEL ELEMENT

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Fig. 1.

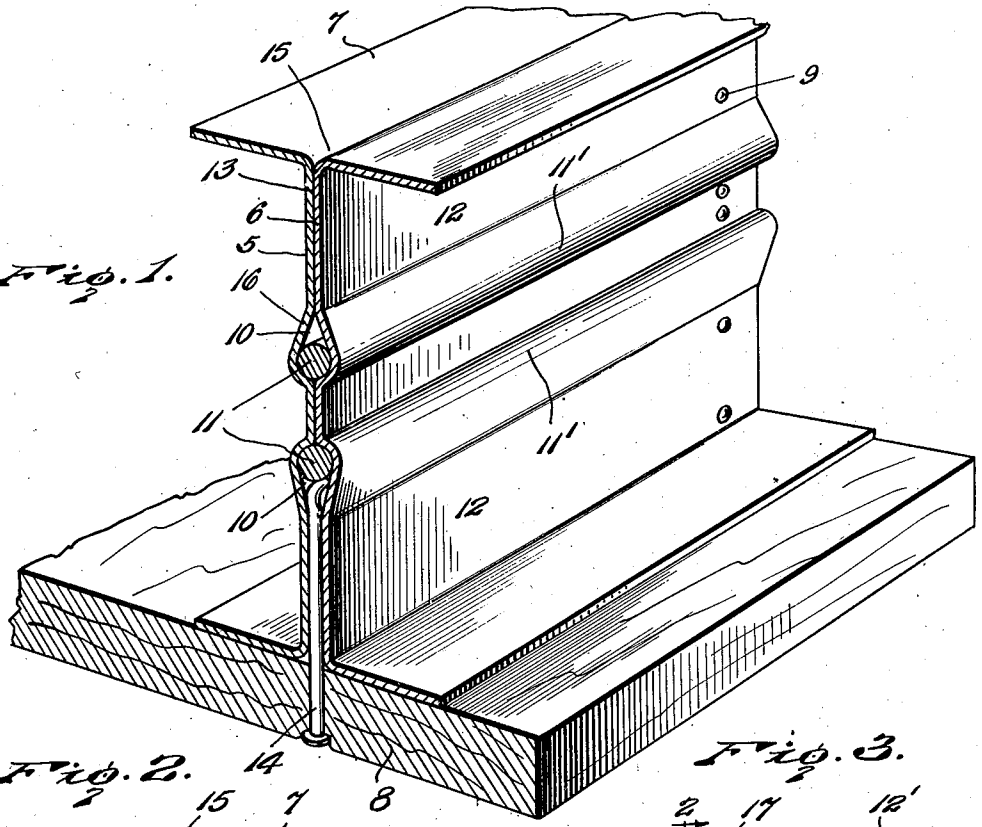


Fig. 2.

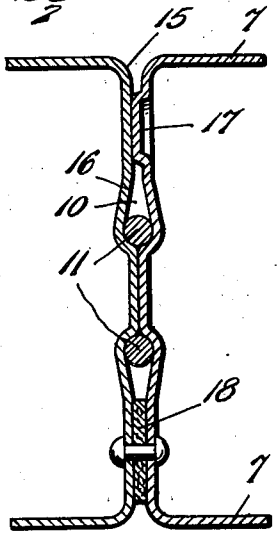


Fig. 3.

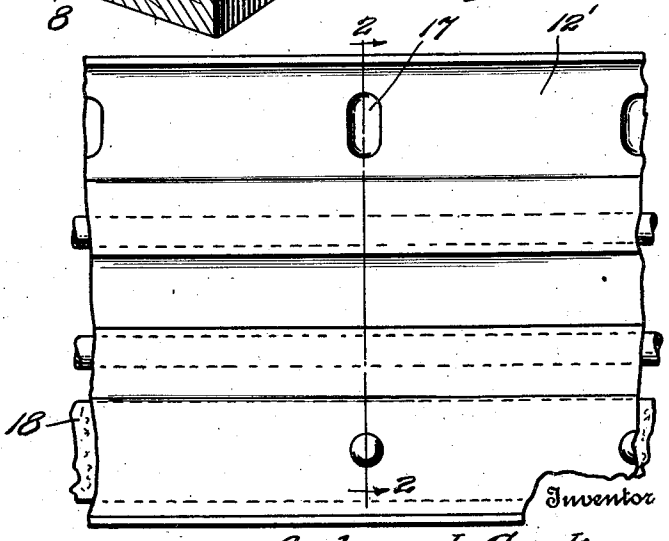
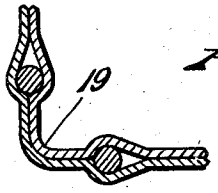


Fig. 4.



Inventor

Andrew I. Syak.

By Lacey & Lacey, Attorneys

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Fig. 5.

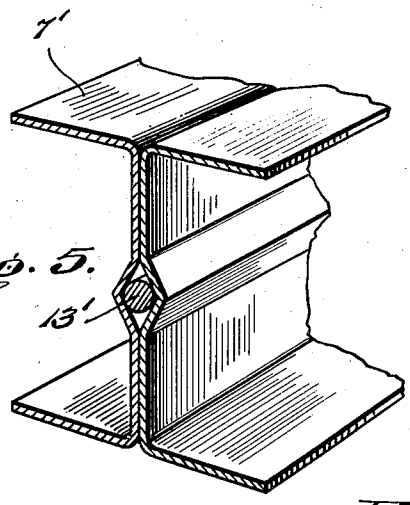


Fig. 6.

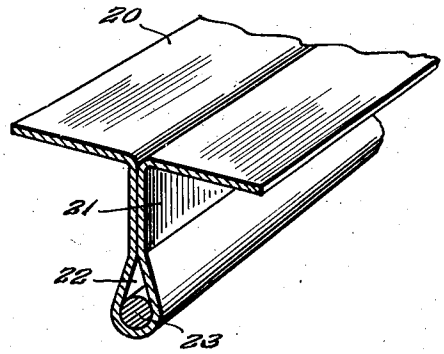


Fig. 8.

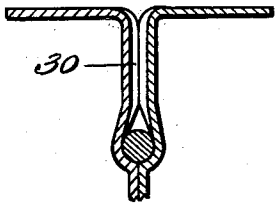


Fig. 7.

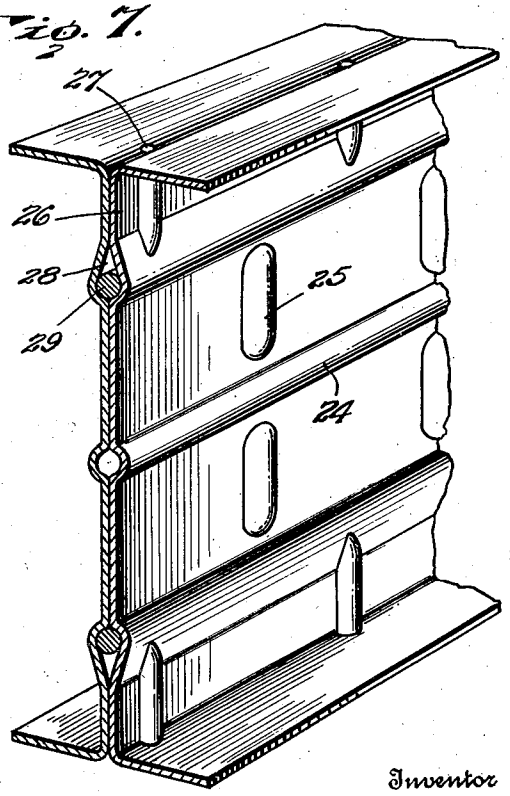
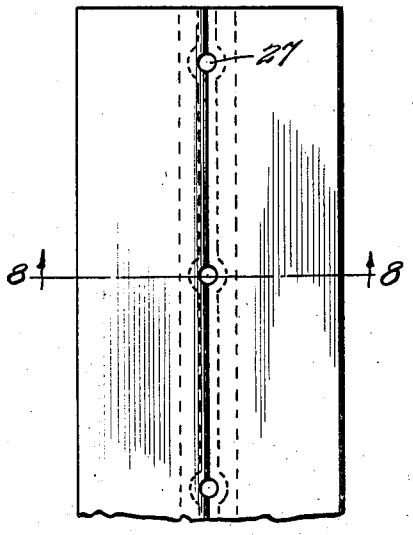


Fig. 9.



Inventor

Andrew I. Syak.

By Lacey & Lacey, Attorneys

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2,160,345

UNITED STATES PATENT OFFICE

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STRUCTURAL STEEL ELEMENT

Andrew I. Syak, Girard, Ohio

Application March 9, 1938, Serial No. 194,927

4 Claims. (Cl. 189—37)

This invention relates to steel beams for use in the construction of buildings and has for its object to provide an all steel composition beam having the requisite strength and rigidity effectually to resist all tensile and compression strains to which it may be subjected under load conditions.

A further object of the invention is to provide an all steel beam, the construction of which is such that interior and exterior wood nailing strips may be rigidly fastened thereto by means of ordinary securing nails and without the necessity of perforation or otherwise forming holes in the metal to receive said nails.

A further object is to reinforce the structural beam by the provision of longitudinal strengthening rods which also serve to upset or clinch the pointed ends of the securing nails.

A further object is to provide an all steel structural I-beam comprising mating sections, spot welded, riveted or otherwise rigidly united and each provided with terminal angular flanges against which the interior or exterior wood nailing strips are adapted to rest, the confronting faces of the mating sections serving to guide the securing nails in engagement with the clinching element when attaching said wood strips.

A still further object of the invention is generally to improve this class of devices so as to increase their utility, durability and efficiency.

In the accompanying drawings forming a part of this specification and in which similar numerals of reference indicate corresponding parts in all the figures of the drawings:

Figure 1 is a sectional perspective view of an all steel structural beam embodying the present invention showing the manner of attaching wood nailing strips thereto,

Figure 2 is a vertical sectional view taken on the line 2—2 of Figure 3,

Figure 3 is a side elevation illustrating a modified form of the invention,

Figure 4 is a detail sectional view of a portion of a corner or angular I-beam,

Figure 5 is a sectional perspective view showing an angular seat for the combined reinforcing and clinching rod,

Figure 6 is a similar view showing a single flange I-beam,

Figure 7 is a sectional perspective view illustrating a further modification,

Figure 8 is a transverse sectional view taken on the line 8—8 of Figure 9, and

Figure 9 is a top plan view of Figure 7.

The embodiment of the invention shown in Figure 1 comprises an all steel I-beam formed of mating sections 5 and 6 having their opposite ends bent laterally to form terminal flanges 7 against which a wood nailing strip 8 is adapted to rest and be securely anchored thereto. The mating sections 5 and 6 are preferably secured together by spot welding 9 although rivets or other fastening devices may be employed if desired. The metal forming the mating sections 5 and 6 is pressed laterally at points remote from the flanges 7 to form tubular seats 10 adapted to receive longitudinally disposed reinforcing rods 11, which rods also serve as clinching elements, as will be more fully explained hereinafter. It will thus be seen that, when the sections 5 and 6 are united, they form a vertical web 12 connecting the flanges 7 which web is reinforced by the outwardly curved walls 11' of the seats 10 as well as by the rods 11. The confronting walls of the vertical web 12 near the flanges 7 are normally disposed parallel and in contact or substantial contact with each other so as to form an intermediate vertical guide 13 for a nail or similar securing devices, indicated at 14. The guides 13 communicate with the adjacent seats 10 and the inner walls of said guides at their junction with the flanges 7 are pressed or curved laterally at 15 to assist in directing the nails between the mating elements 5 and 6 when fastening the wood strip 8 on the flanges 7. The bottom of the seats 10 are preferably curved to conform to the curvature of the adjacent reinforcing rod 11 while the side walls of the seats at the upper ends thereof are tapered at 16 so that, when one of the securing nails is driven home, the point thereof will be guided against the rod 11 and the pointed terminal thereof bent or clinched so as to prevent accidental displacement of the nail and securely anchor the wood strip 8 in position on the beam.

In operation, one of the wood strips 8 is placed against the upper or lower or both flanges 7 of the I-beam, after which the securing nails 14 are driven through the wood strip or strips and thence between the mating members 5 and 6 at the vertical web 12. When the points of the nails 14 come in contact with the adjacent reinforcing rod 11, said points will be deflected laterally, as best shown in Figure 1 of the drawings, so that the wood strip will be securely anchored in position on the beam.

In Figures 2 and 3 of the drawings, there is illustrated a modified form of the invention in

which the vertical webs 12' are formed with inwardly pressed bosses 17 which serve to strengthen the structure and also to indicate where the mating members comprising the beam should be spot welded. In this form of the device, an all weather insulating strip 18 may be interposed between the mating members comprising the beam adjacent either the upper or lower flanges thereof and this strip 18 not only serves to space the mating members comprising the beam to accommodate the securing nails but also checks corrosion and strengthens the beam. When using the beams at the corner of a building, said beams may be bent in angular form, as illustrated at 19 in Figure 4 of the drawings, the construction and operation of the device being otherwise similar to that shown in Figure 1.

In Figure 5 of the drawings, there is illustrated an all steel beam having a single clinching element 13' disposed intermediate the flanges 7' and the seat for this combined reinforcing rod and clinching element is preferably of diamond shape so that securing nails driven between the beam sections from either the top or bottom of the beam will be directed in contact with said rod or clinching member 13'. In Figure 6 of the drawings, the beam is constructed from a single strip of metal bent to form supporting flanges 20 and a depending web 21 terminating in a seat 22 for the reception of a combined reinforcing rod and clinching member, indicated at 23.

A further modified form of the invention is illustrated in Figures 7 to 9 inclusive. In this form of the device, the mating sections constituting the I-beam are bent or rolled to form an intermediate tubular reinforcing member 24 and the metal above and below the tubular reinforcing member 24 is bent or pressed to form vertical reinforcing bosses 25. Instead of driving the nails between the walls of the vertical webs 26, the metal at said walls is pressed laterally to form guiding sockets 27 which communicate with the adjacent seats 28 so that, when securing a wood strip to the flanges of the beam, the securing nails will be guided by the sockets 27 into contact with the reinforcing rods 29 and the points of the nails bent or clinched, as will be readily understood. If desired, the walls of the sockets 27 may be provided with ribs or fins 30 to strengthen the sockets and assist in guiding the securing nails when being driven in position on the beam.

While the details of construction of the different forms of the device vary somewhat, they each include an all metal structural beam having upper and lower supporting flanges for engagement with a wood nailing strip and a combined reinforcing and clinching member disposed intermediate of the web of the beam for clinching the points of the securing nails when the latter are driven into position to secure the strips on the beam.

It will, of course, be understood that the beams may be made in different sizes and shapes and constructed of suitable material without departing from the spirit of the invention.

Having thus described the invention, what is claimed as new is:

1. A structural beam comprising mating sections having terminal flanges adapted to receive a nailing strip and connected by a vertical web, opposed portions of the walls of the web being pressed laterally outward to form a longitudinally disposed seat extending the full length thereof, a combined reinforcing rod and clinching member fitting in said seat and having uninterrupted contact with the side walls of the seat, and securing devices adapted to pass through the nailing strip and between said sections and into said seat for engagement with the confronting surface of the clinching member to deflect the ends of the securing devices.

2. A structural beam comprising mating sections having terminal flanges adapted to receive a nailing strip, said sections having face to face engagement with each other to form a vertical web connecting said flanges, the walls of the flanges at their junction with the web converging inwardly and downwardly to form guides, a clinching member interposed between the web forming portions of the sections and having uninterrupted contact with the side walls thereof, and securing nails adapted to pass through the nailing strip and between said sections at the guides for engagement with the clinching member to deflect points of the nails and prevent outward movement of the nails.

3. A structural beam comprising mating sections having terminal flanges connected by a vertical web, the walls of the web between the flanges being bent laterally to form a hollow longitudinal reinforcing core and the material above and below the hollow core being pressed laterally to form vertical reinforcing bosses, combined reinforcing rods and clinching members interposed in seats extending longitudinally of the web between the mating sections intermediate the core and said flanges, and sockets formed in the vertical web, said sockets having their inner ends communicating with the adjacent seat and the clinching member therein and their outer ends opening through said flanges.

4. A structural beam comprising mating sections having terminal flanges connected by a vertical web, the opposed portions of the material of the sections at said web being pressed laterally and outwardly in opposite directions to form a tubular seat, a clinching member fitting within said seat and having uninterrupted contact with the side walls of said seat, the walls of said seat converging in the direction of the flanges, a nailing strip resting on said flanges, and securing nails passing through the nailing strip and between the confronting faces of the mating sections at said web for abutting engagement with the clinching member, the points of the nails being guided by the converging walls of the tubular seat into engagement with the confronting surface of the clinching member to deflect the points of the nails and prevent withdrawal thereof.

ANDREW I. SYAK.