Dec. 22, 1936. G. G. GREULICH 2,065,494

WELDED STRUCTURAL MEMBER

Filed July 30, 1936

Fig. 1.

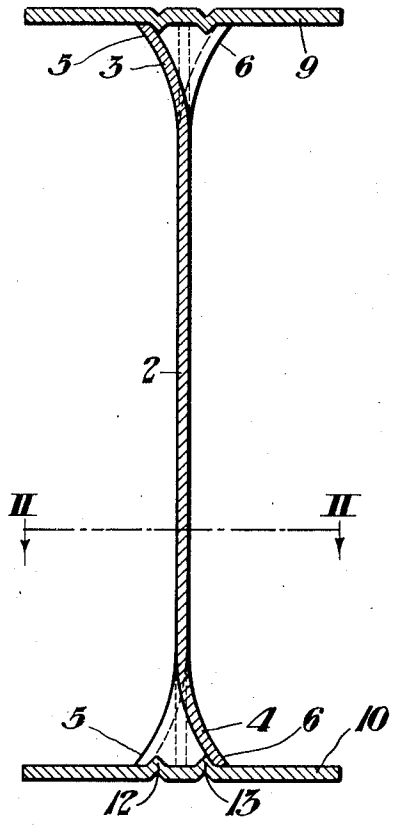


Fig. 2.

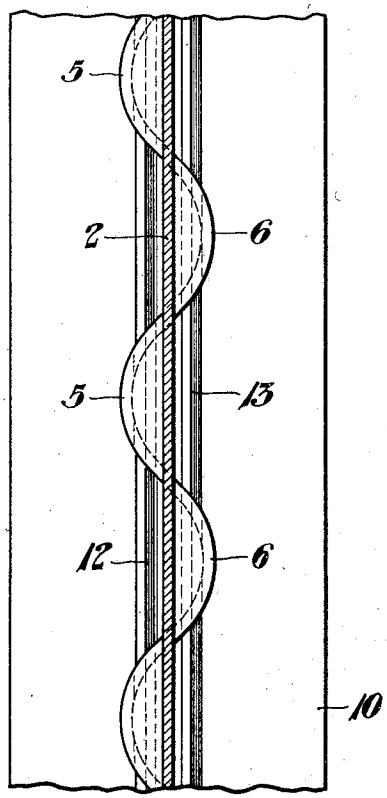


Fig. 3.

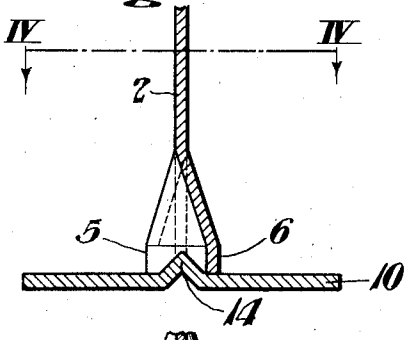


Fig. 4.

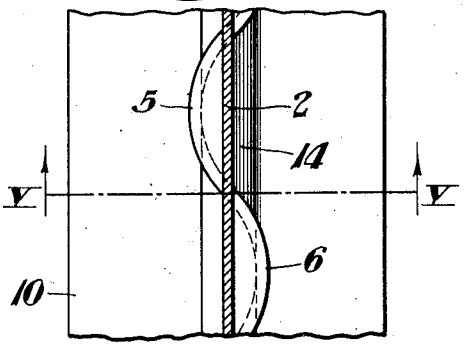
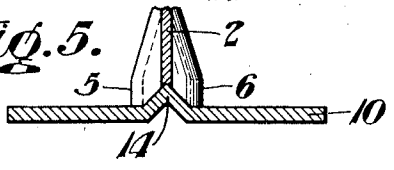


Fig. 5.



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WELDED STRUCTURAL MEMBER

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4 Claims. (Cl. 189—37)

The present invention relates to the production of welded structures by means of a suitable web and a flange welded thereto with integral means for automatically producing welds spaced in a manner essential to securing a rugged ductile section.

Other objects and advantages will become apparent as the description proceeds, in which:

Figure 1 is a transverse sectional view of the assembled structure;

Figure 2 is a section on line II—II of Figure 1;

Figure 3 is a detailed transverse section of another form of assembled structure; and

Figure 4 is a section on line IV—IV of Figure 3.

Figure 5 is a section on line V—V of Figure 4.

In the drawing, the numeral 2 designates a metallic strip of suitable gauge and dimensions from which the web of the structural member is to be fabricated. The strip 2 is crimped on both of its edges, as indicated at 3 and 4. The crimped portions 3 and 4 extend alternately to opposite sides thereof, as shown at 5 and 6, and do not extend the full width of the strip 2.

A pair of flanges 9 and 10 are disposed at right angles to the strip 2 and provided with longitudinal projecting ribs or beads 12 and 13, in spaced parallel relation, on the face of the flange. These continuous longitudinal ribs or beads 12 and 13 intersect the corrugated portions 3 and 4 of the web member at regularly spaced intervals. The outline of the crimped portions is that of a wave, as indicated in Figure 2, with portions of the edge running substantially transversely to the ribs or beads 12 and 13 on the flanges. The flanges and web 2 are welded together in any conventional manner, and by providing a rib or ribs on the flanges the position of the welds may be located and controlled, so that only that part of the metal in the rib or ribs which is in contact with the flared portions of the web edge is transformed in its crystalline structure. Thus the flange is exposed to such a transformation only at intermittent intervals, and not continuously for its entire length. This also applies to the metal in the edge of the crimped web. Consequently, approximately one-half of the flange metal is not heated sufficiently in the welding process to seriously disturb its grain structure or to lose the ductile qualities of solid rolled sections. The crimped portions 5 are welded to the rib 12 on one side of the vertical plane of the web, and the flared portions 6 are welded to the other rib 13 on the opposite side of the web, thereby producing welds spaced in a manner essential to securing a rugged ductile section.

In the construction shown in Figures 3 and 4, the flanges are provided with a single longitudinal projecting rib 14 which intersects the flared portions 3 and 4 of the crimped edges of the web at regularly spaced intervals. When the flanges and web are welded together, only that part of the metal in the rib in contact with the flared portions 3 and 4 is transformed in its crystalline structure.

Heretofore, attempts have been made to weld a web member at right angles directly to a flange member. This did not prove satisfactory, as the continuous weld was easily broken. One-half, or sometimes the entire flange, would break off under a sharp blow. It is well known that during the welding process metal adjacent the weld undergoes considerable changes in grain structure, so that the heated metal has the characteristics of cast metal with attendant brittleness, as compared to the toughness and ductility of rolled metal. Consequently, when the weld is made in a continuous line, either a straight line or with the contact formed by a continuous curved line, there is a continuous zone of embrittled metal present in the flange, which produces an unbroken line of weakness in a single plane and permits opposite sides of the flange to be broken off without a great deal of force.

By the method of the present invention it is possible to use and secure the benefits and advantages of welding a structural section, while at the same time retaining the essential qualities of toughness and ductility in the finished member as a whole.

The principle involved may be applied with web members and flange members of other shapes. It also may be applied to other structural members having a web and a flange or flanges welded thereto, such as, for example, T's and other common types.

While I have shown and described specific embodiments of the invention, it is to be understood that I do not wish to be limited exactly thereto, since various modifications may be made without departing from the scope of the invention, as defined in the following claims.

I claim:

1. A welded I-beam comprising a web having each of its edges corrugated to form portions flared alternately in opposite directions and flanges provided with at least one longitudinal projection welded at spaced intervals to said flared portions of said web so that only that portion of the metal in the web edge in contact with the rib is transformed in its crystalline structure,

the weld being interrupted along the longitudinal plane of said beam.

2. A welded structural member comprising a web and a flange extending from at least one edge of said web, said flange provided with at least one longitudinal rib, said web being crimped on at least one of its edges to extend alternately from both sides of said web and on each side of said rib, the welding of said web and flange being interrupted along its longitudinal plane so that only that portion of the rib and crimped edge in contact with each other is changed in its crystalline structure and not continuously for its entire length.

3. A welded structural member comprising a web having alternately crimped edge portions and flanges adjacent the crimped edge portions of said web, said flanges provided with spaced longitudinal ribs adapted to engage the alternate crimped portions of said web, the web and flanges being welded together at the points of contact of the alternate crimped edge portions with the ribs whereby only that portion of the metal in the ribs and web which contact each other is transformed in its crystalline structure at intermittent intervals and not continuously for its entire length.

4. A welded structural member comprising a web portion alternately crimped on at least one of its edges and a flange extending from at least one of the edges of said web, said flange provided with at least one longitudinal rib on one of its faces, said crimped portions of said web extending entirely on each side of the rib, the web and flange being welded at spaced intervals so that only that portion of the rib in contact with the web edge is transformed in its crystalline structure and not continuously for its entire length.

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