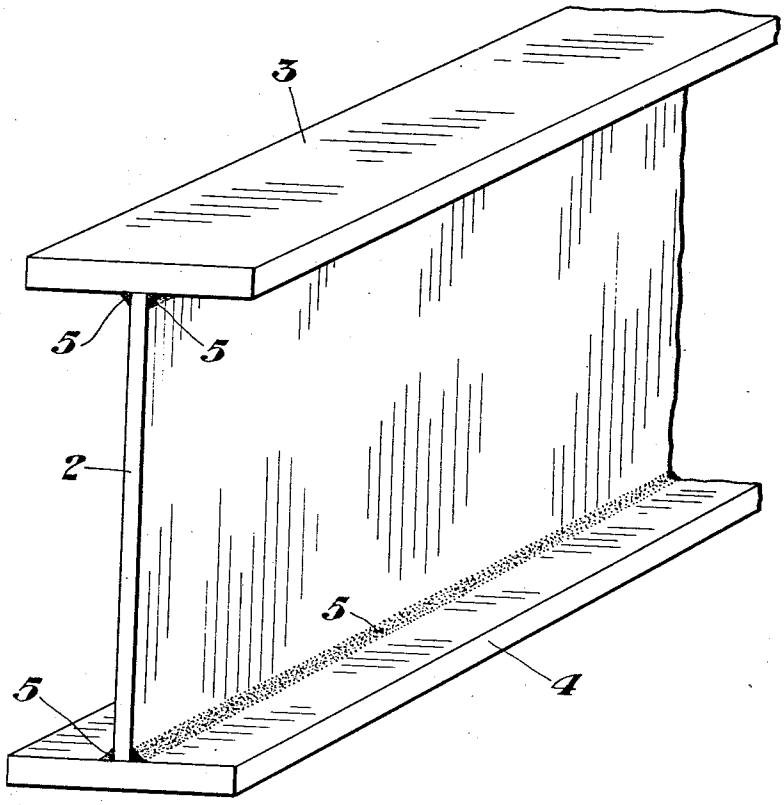
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R. H. WATSON

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BEAM AND THE LIKE

Filed April 28, 1930



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UNITED STATES PATENT OFFICE

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BEAM AND THE LIKE

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This invention relates to structural shapes and, while not limited thereto, relates more particularly to structural shapes of the larger sizes such as beams having a depth of 30 inches and/or greater.

The market for such beams, while existing, is limited while the cost of the rolling mill equipment necessary to make a full line of beams of such sizes is so great that the size of rolled steel shapes of this character is limited to 36 inches.

One object of my invention is the provision of integrally formed shapes of any desired depth and proportions in a rapid, cheap and economical manner.

Another object of the invention is to provide structural shapes wherein the capacity of the shapes per cent. of weight is greatly increased and/or weight of the shapes per unit of strength is materially limited.

Heretofore rolled beams and also built-up beams have been composed of steel of the same or substantially the same analysis throughout, and since the usual loading on beams produces a tension stress in the bottom flange, a compressive stress in the upper flange and a shearing stress in the web, it has been necessary to increase the weight of some parts beyond that necessary to withstand its stresses in order to have the other parts of sufficient weight to carry their own stresses. In every instance the beams were of greater weight than would be necessary if the steel in the webs and flanges were that best suited to withstand the particular stresses imparted to such parts.

The present invention provides a novel beam construction in which the web and flanges are formed from separate rolled steel plates and, therefore, may be formed from steel having characteristics best suited to withstand the particular stresses to which the web and flanges are subjected.

In the drawing:

The figure is a perspective view of a section of beam constructed in accordance with my invention.

Referring more particularly to the drawing, the numeral 2 designates the web portion which is preferably formed from a plain rolled steel plate, and the numerals 3 and 4 designate the upper and lower flanges which are preferably formed of high silicon, high manganese rolled steel plates. The flange plates 3 and 4 are secured to the web plate 2 by continuous lines of weld 5 along each longitudinal edge of the web plate.

If desired, the top and bottom flange plates 3 and 4, respectively, may be formed from steel of different analysis.

A comparison has been made of various rolled metal sections of the prior art with sections of the same size constructed in accordance with this invention, using plain steel webs and flanges of high silicon, high manganese steel having substantially the following analysis—.34 carbon, .80 manganese, .25 to .35 silicon, phosphorus and sulfur under .05 with an ultimate fiber stress of 85,000 pounds and a safe fiber stress of 25,000 pounds. This comparison has shown that beams constructed in accordance with this invention may have their flange and web thicknesses materially reduced without reducing their load carrying capacities so that a saving of more than 20 per cent. in weight of the beam may be made.

The invention is illustrated in connection with arc welding but it is applicable also to shapes in which the parts are welded together by any one of various other known or suitable methods.

While I have shown and described a certain specific embodiment of my invention it will be understood that I do not wish to be limited thereto since various modifications may be made without departing from the scope thereof, as defined in the appended claims.

I claim:

1. As a new article of manufacture, the structural shape which comprises integral flange and web portions formed of rolled metal plates and welds uniting the flanges and longitudinal edges of the web portions into a unified structure, the tensile strength of the flange metal being greater than that of the web.

2. As a new article of manufacture, the structural shape which comprises integral

flange and web portions formed of rolled metal plates and welds uniting the flanges and longitudinal edges of the web portions into a unified structure, said web portion being composed of plain steel and said flange portions being composed of high silicon, high manganese steel.

3. As a new article of manufacture, the structural shape which comprises integral flange and web portions formed of rolled metal plates and continuous welds uniting the flanges and longitudinal edges of the web portions into a unified structure, said web portion being composed of plain steel and said flange portions being composed of high silicon, high manganese steel.

4. As a new article of manufacture, the structural shape which comprises integral flange and web portions formed of rolled metal plates and with the flange portions united to the longitudinal edges of the web portions by substantially continuous line welds, said webs being composed of plain steel, and said flanges being composed of a high silicon, high manganese steel having a fiber stress of above 80,000 pounds.

5. As a new article of manufacture, the structural shape which comprises integral flange and web portions formed of rolled metal plates and with the flange portions united to the longitudinal edges of the web portions by substantially continuous line welds, said webs being composed of plain steel, and said flanges being composed of a high silicon, high manganese steel having substantially the following analysis—.34 carbon, .80 manganese, .25 to .35 silicon, phosphorus and sulfur under .05, and having an ultimate fiber stress of approximately 85,000 pounds.

6. As a new article of manufacture, the structural shape which comprises integral flange and web portions formed of rolled metal plates and with the flange portions united to the longitudinal edges of the web portions by welds, said webs being composed of plain steel, and said flanges being composed of a high silicon, high manganese steel having substantially the following analysis—.34 carbon, .80 manganese, .25 to .35 silicon, phosphorus and sulfur under .05, and having an ultimate fiber stress of above 80,000 pounds.

In testimony whereof, I have hereunto set my hand.

RALPH H. WATSON.