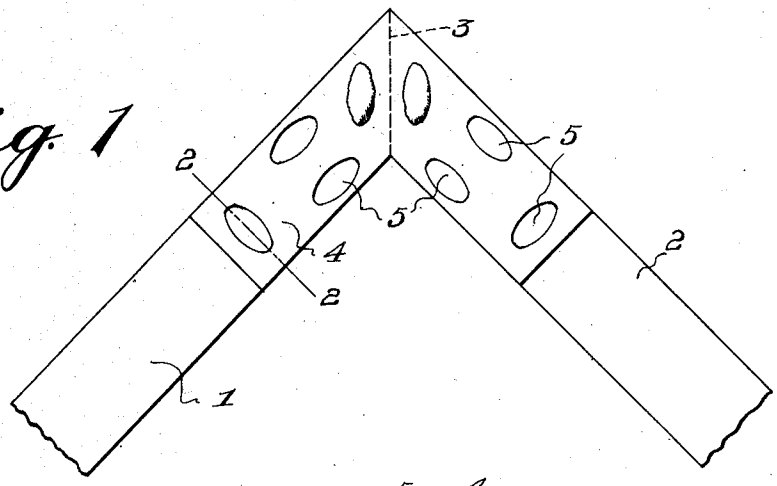
July 5, 1927. 1,634,675

R. MATTICE

METHOD OF ELECTRIC WELDING

Filed Aug. 21, 1925

Fig. 1



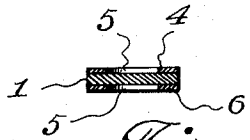


Fig. 2



Fig. 4

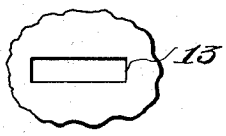
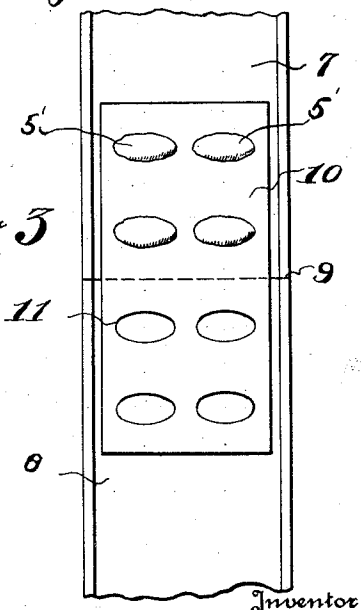


Fig. 5



Fig. 7 Fig. 6

Fig. 3



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UNITED STATES PATENT OFFICE.

ROYAL MATTICE, OF BETHLEHEM, PENNSYLVANIA.

METHOD OF ELECTRIC WELDING.

Application filed August 21, 1925. Serial No. 51,656.

This invention relates to a method of electric welding and refers more particularly to a method of connecting metallic elements together.

It is well known in the art that in connecting metallic elements together, a plate is riveted to each of said elements across the meeting edges thereof, said rivets holding the elements and the plate together in a substantially rigid manner. While this method is satisfactory, generally speaking, yet it has been found that under some conditions the riveted structure would not withstand certain strains and stresses and the rivets would shear off. The riveted structure is also more or less weakened because the metallic elements themselves are weakened due to the rivet receiving apertures or openings.

Later in the art, a connecting element was welded to the metallic elements, sometimes around the edge of the connecting element, and sometimes by flowing metal into substantially circular apertures formed in said connecting element. This method also, was satisfactory in a large number of instances, yet it was also found that under numerous conditions the connecting element would become separated from the metallic elements at the points of weld, or the weld itself would shear off in a manner similar to the shearing of the rivets. This is due, it is believed to the fact that the cross sectional area of a circular weld is no more than the cross sectional area of the rivets and the only advantage obtained by the above mentioned type of weld is that the metallic elements themselves are not weakened.

In the construction of buildings, bridges or the like, of the present day, it is now the common practice to position two H-beams end to end, and then rivet a plate to each H-beam across the meeting edges of the beams. It will be obvious and it has been recognized heretofore that in doing this the web of the H-beam is materially weakened because of the rivet receiving apertures formed therein. It is also well known that the rivets being comparatively small are very liable to shear off in time, due to normal settling of the entire building or other outward forces.

It has been found highly desirable that some method be devised by which the strength of connected building elements be increased and the disadvantages present in the usual riveted structure be eliminated. To this end, the present invention has been devised and under actual tests it has been found that a building, bridge or the like in which the frame work, girders or other building elements used in the construction thereof are connected by the method shown in the present invention and hereafter described will stand a pressure or strain of only approximately 46,000 pounds, and under numbers of conditions structures must be able to withstand far greater pressure, strains or stresses than this limit.

It is therefore, one object of the present invention to provide a method of electric welding.

Another object of this invention is the provision of a method of connecting together metallic elements by electric welding.

A still further object of this invention is the provision of a method of connecting together metallic elements by electric welding whereby to provide an integral structure having great resistance to stresses and strains in substantially all directions.

Another object of the invention is the provision of a particular type of opening into which to flow the welding metal whereby a weld is provided which is capable of withstanding far greater strain than welds of present day usage.

Other objects and advantages of this invention will be apparent from the following description, taken in conjunction with the accompanying drawings, in which:

Figure 1 is a front elevation of angle beams connected together by the method of the present invention.

Fig. 2 is a sectional view of the line 2—2, Fig. 1.

Fig. 3 is a front elevation of H-beams connected together by the method of the present invention, and

Figs. 4, 5, 6, and 7 are views showing various forms of apertures which may be used in the method of the present invention.

Referring now, more particularly to the drawings, which, it will be understood are for illustrative purposes only, in Fig. 1 are shown two bars or beams 1 and 2 respectively fitted together to form an angular structure, the juncture being indicated at 3. In connecting the two bars 1 and 2 together to form an integral, rigid structure, I provide an angular connecting element 4, the angle of which is substantially similar to the

angle formed by bars 1 and 2. In the connecting element 4 I then form a plurality of apertures 5, the longitudinal dimension of each of which is greater than the transverse dimension thereof. As shown clearly in Fig. 1, each section or portion of the connecting element 4 is provided with a like number of openings 5, but this is merely by way of example. However, the arrangement of the openings in the connecting element is important, and it will be seen that one opening in each section is formed substantially parallel with the juncture of the bars 1 and 2 and intermediate openings in each section are provided which are substantially parallel with the longitudinal axis through each section of the element 4 and an end opening is provided in each section which is arranged substantially transverse to the longitudinal axis through each section of the element 4. From the above described arrangement it will be obvious that after the element 4 is welded to the bars 1 and 2 respectively, the points of weld, or welded sections are so arranged as to take up stresses and strains arising from almost every conceivable direction.

In the present method, two connecting elements are shown; that in Fig. 1 being designated at 4, while in Fig. 2, the connecting element is designated as 6; it being understood that two of such elements are used, one on each side of the bars 1 and 2, respectively. This is the case where an unsupported structure is being formed but obviously the invention is not limited to the use of two connecting elements, one arranged on each side of the structure, as in many cases, a single connecting element is desirable and perfectly satisfactory in use.

Having formed the apertures 5 in the connecting element, the latter is placed across the juncture 3 of the bars 1 and 2 as clearly shown in Fig. 1, and the element 4 electrically welded to the bars 1 and 2 by flowing metal into the apertures 5, shown at 5'.

The apertures 5 having a greater longitudinal dimension than a transverse dimension (the form shown in Fig. 1 being substantially elliptical) will cause the metal flowed thereinto during the welding operation to assume the form of a ledge or shelf, which latter is united to both the connecting element 4 and the bars 1 and 2, and it will be obvious that a shelf or ledge as specified will furnish a far more substantial and satisfactory connecting medium for the element 4 and bars 1 and 2 than is possible by the use of a rivet or a small circular weld. In practice it has been found that while a circular weld will stand approximately a 46,000 pound pressure or strain, a weld having a shelf or ledge formed through the medium of an elliptical aperture will stand a pressure of approximately 94,000 pounds.

Fig. 3 shows H-beams or the like designated as 7 and 8, they being superimposed, the juncture being indicated at 9. In connecting these two beams 7 and 8 together, a substantially straight connecting element 10 is provided having apertures 11 formed therein transverse to the longitudinal axis of said beams 7 and 8. The element 10 is electrically welded to the beams 7 and 8 across the meeting edges or juncture 9 thereof, thereby forming a plurality of ledges of shelves at the places of weld. This method is applicable where it is desired to superpose one beam on another. In the case where it is desired to arrange the beams 7 and 8 in a horizontal position, it will be obvious that the apertures are arranged parallel with the longitudinal axis of the beams.

In Figs. 4 to 7 inclusive I have shown modified forms of apertures 12, but in each, it will be apparent that the longitudinal dimension is greater than the transverse dimension, whereby to form shelves or ledges at the places of weld.

From the above description it is believed that the invention will be apparent but I desire it understood that the drawings are for illustrative purposes only and that various changes may be made such as fall within the scope of the appended claims without departing from the spirit of the invention.

What I claim is:

1. The method of electric welding which includes forming in a connecting element an opening, the longitudinal dimension of which is greater than the transverse dimension and then flowing metal into said opening to form a shelf at the place of weld transverse to the line of strain, and having a greater longitudinal dimension than a transverse dimension.

2. The method of connecting metallic members which includes forming a plurality of openings in a connecting element, the longitudinal dimension of which openings is greater than the transverse dimension thereof and electrically welding said connecting element to said members by flowing metal into said openings whereby to form shelves at the places of weld above and below the meeting edges of said metallic members which are transverse to the line of strain to which said metallic members may be subjected, said shelves having a greater longitudinal dimension than a transverse dimension.

3. The method of connecting metallic elements which comprises forming an angular structure, placing an angular connecting element in contact with said angular structure, said connecting element being provided with a plurality of openings the longitudinal dimension of each of which is greater than the transverse dimension thereof, and electrical-

ly welding said connecting element to said angular structure at the openings in the connecting element whereby to form shelves at the places of weld on each side of the meeting edges of said metallic elements, the longitudinal dimension of said shelves being arranged transverse to the line of strain to which the angular structure is subjected.

4. The method of connecting metallic members which comprises arranging said members end to end, forming a plurality of openings in a connecting element, the longitudinal dimension of each of said openings being greater than the transverse dimension thereof, positioning the connecting element in contact with the metallic members and across the meeting edge thereof and welding said connecting element to said metallic members on each side of the meeting edge of the latter through the openings in said connecting element by flowing metal into said openings whereby to form shelves at the places of weld which shelves are arranged transverse to the line of strain to which the metallic members are subjected, said shelves having a greater longitudinal dimension than a transverse dimension.

In testimony whereof I affix my signature.

ROYAL MATTICE.