May 2, 1933. H. B. MASSEY ET AL 1,906,915

BUS BAR CLAMP

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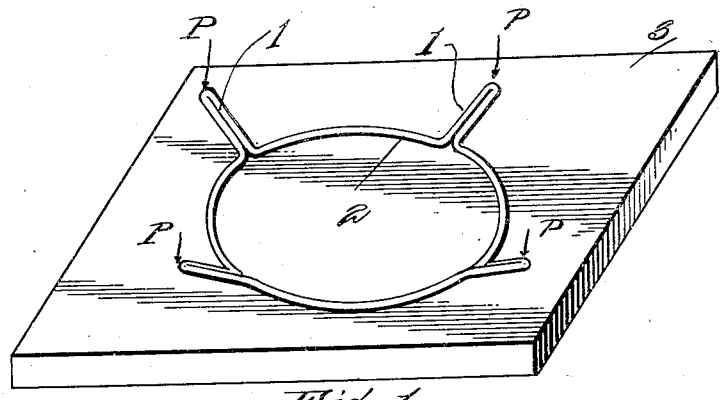


Fig. 1.

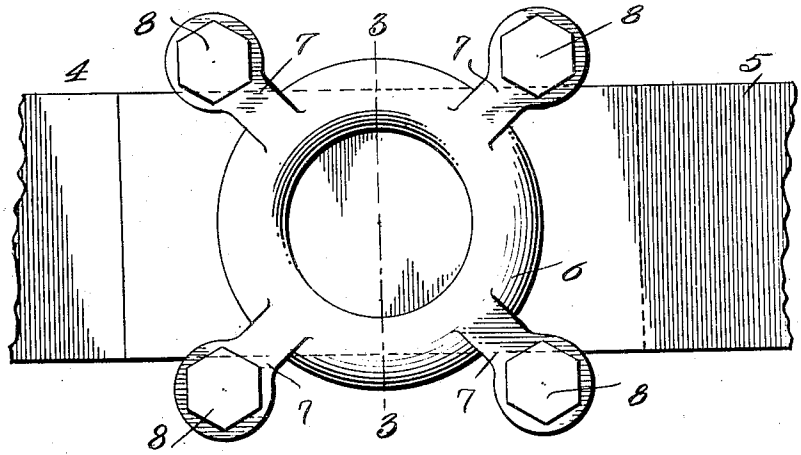


Fig. 2.

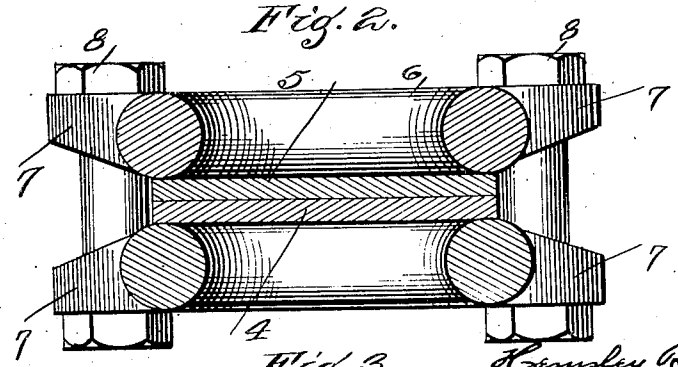


Fig. 3.

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Fig. 4.

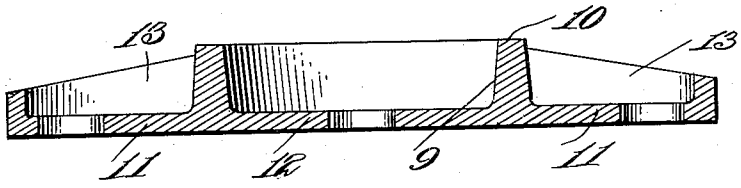


Fig. 6.

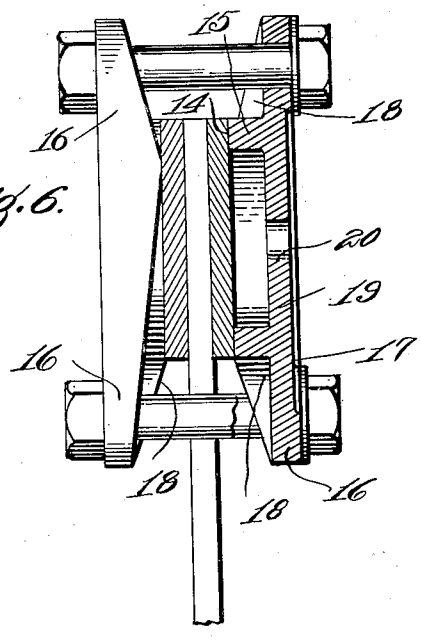
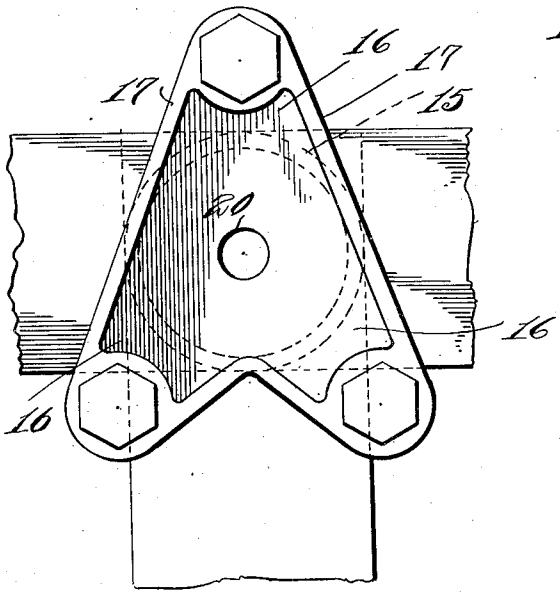


Fig. 5.



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UNITED STATES PATENT OFFICE

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BUS BAR CLAMP

Application filed October 4, 1930. Serial No. 486,455.

This invention relates to bar conductor clamps of the type employed in splicing rectangular bus bar sections or in tapping to the same.

As a matter of convenience, it has been the recent practice to make splices or tapped connections by clamping the rectangular bus bar sections together with metal clamps having two, three or four bolts. In many respects such clamped connections have been inferior to the older type of connections in which the bars were drilled and the clamp bolts extended through the bus bar sections. The metal plate clamps are open to the serious objection that the plates deflect under the clamping pressure and concentrate the pressure in local areas adjacent the clamping bolts. It has been found impractical to make the plates of such heavy construction that such deflection is eliminated, and attempts to compensate for such deflection by an initial crowning of the plates have failed due to the difficulty in obtaining the intended curvature and/or the intended bolt pressure, as well as to local imperfections in the metal plates.

An object of the present invention is to provide bus bar clamps of relatively light construction which, within the ultimate strength of the material, will present substantially plane surfaces to the bus bars for all bolt pressures. More particularly, an object is to provide a bus bar clamp of such configuration that the contact surface remains planar under a combination of bending and torque stresses established by the clamping bolts.

These and other objects of the invention will be apparent from the following specification when taken with the accompanying drawings, in which

Fig. 1 is a diagrammatic view illustrative of the invention,

Fig. 2 is a side elevation of a bus bar splice made with a clamp embodying the invention,

Fig. 3 is a vertical section through the same,

Fig. 4 is a central section through another form of clamp, and

Figs. 5 and 6 are a front and side elevation, respectively, of another form of clamp embodying the invention.

Referring to Fig. 1, it can be shown experimentally that if approximately uniform pressures, indicated by arrows P, are applied to radial extensions 1 on a wire annulus 2, the annulus will be deformed but there will be substantially no tendency for any part of the annulus to rise above the plane support 3 upon which the annulus rests. In other words, the lower surface of the annulus remains planar under the influence of the bending and torque stresses due to the applied pressures.

As shown in Fig. 2, a clamp of general form of this wire annulus is employed to join the ends of bus bars 4, 5. Each clamp comprises a ring 6 of circular cross-section having four arms 7 projecting radially therefrom to receive clamping bolts 8.

As shown in Fig. 4, the clamp takes the form of a short cylinder 9 having an annular clamping surface 10 at one end, and radial clamping arms 11 extending from the other end. If desired, the outer end of the cylinder may be closed, in whole or in part, by a diaphragm or end wall 12. To reinforce the clamping arms 11, and to distribute the stresses to the cylinder 9, the clamping arms may have peripheral flanges 13 merging in the cylinder 9.

As shown in Figs. 5 and 6, the annular clamping surface 14 is provided by the end of a short cylinder 15 from which extend three radial arms 16, the angular disposition of the arms being such that two lie at one edge of the bus bar, and the third is symmetrically located at the opposite edge. The outer surfaces of the clamping arms have peripheral ribs 17, the ribs of adjacent arms preferably merging at sections which form, in effect, extensions of the cylinder 15. The inner faces of the radial arms have similar reinforcing and stress distributing flanges 18 which extend to the cylinder 15 and preferably underlie the outer reinforcing ribs 17. The outer end of the cylindrical portion 15 is closed by an end wall 19, which may have central aperture 20 for receiving a clamp bolt in case it is desired to pass such a bolt directly through

the bus bars to reinforce or to replace the bolts through the radial arms. When the end closure is employed, the clamping arms preferably lie in the same plane as the closure. By appropriate design, the outer reinforcing ribs 17 may be omitted, but the lower flanges should, in general, be retained to effect a better distribution of the stresses tending to deform the cylindrical portion.

It will be apparent that the clamping pressure must be applied at more than two points if spherical deformation, as distinguished from cylindrical deformation, of the annular clamping surface is to be obtained. With this limitation, the number of clamping arms secured to the cylindrical section of the clamp may be varied at will in accordance with the particular form of the bars to be clamped.

We claim:

1. A bus bar clamp comprising a body having an annular contact surface for engagement with the plane surface of a bus bar, and means for applying clamping pressure normal to and offset from the contact surface.

2. A bus bar clamp comprising a body having an annular contact surface for engagement with the plane surface of a bus bar, and means for applying clamping pressure normal to said surface and in a plurality of intersecting planes.

3. A bus bar clamp, as set forth in claim 2, wherein said means comprises clamping arms extending substantially radially from said body.

4. A bus bar clamp comprising an annular body having an annular contact surface for engagement with the plane surface of a bus bar, and means for applying clamping pressures normal to and offset from the contact surface.

5. The invention as set forth in claim 4, wherein said means comprises clamping arms extending substantially radially from said body to define a plurality of planes normal to said contact surface.

6. A bus bar clamp member comprising an annular body portion terminating at one face in an annular contact surface, and clamping arms projecting substantially radially from said body portion to define a plurality of planes normal to said contact surface.

7. A bus bar clamp comprising a cylindrical portion terminating at one end in an annular contact surface, and more than two clamping arms projecting radially from the opposite end of said cylindrical portion.

8. In a bus bar clamp, a body having a cylindrical portion, a diaphragm closing one end of said portion, an annular clamping area at the opposite end of said portion, and means for applying clamping pressure along lines parallel to the axis of said cylindrical portion and offset from axial alinement with said portion.

9. In a bus bar clamp for bus bars of rectangular cross-section, a clamp member comprising a hollow cylindrical portion terminating at one end in a plane substantially normal to the axis of said cylindrical portion, thereby to provide an annular contact surface for contact with a bus bar, and lugs extending radially from the opposite end of said cylindrical portion, said lugs being apertured to receive clamp bolts.

10. A bus bar clamp for bus bars of rectangular cross-section, comprising a pair of clamping members, each member comprising an annular section having a contact surface of annular contour lying in a plane substantially normal to the axis of said annular section, and clamping arms projecting radially from said annular section, said clamping arms being apertured to receive bolts for drawing said members towards each other, thereby to draw the opposed annular contact surfaces of said members against the opposite faces of the bus bars.

11. The invention as set forth in claim 10, wherein said annular sections comprise rings of circular cross-section.

12. The invention as set forth in claim 10, wherein said annular sections comprise cylinders, and said radial clamping arms are spaced axially from the annular contact ends of the respective cylinders.

13. The invention as set forth in claim 10, wherein said annular sections comprise cylinders, and said radial clamping arms are spaced axially from the annular contact ends of the respective cylinders, in combination with reinforcing ribs on said arms and merging into said cylinders.

In testimony whereof, we affix our signatures.

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