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635,883

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PROVISIONAL SPECIFICATION

Improvements in, or relating to, Cycle Frame Lugs, and in the Method of Manufacture thereof

We, WALTON AND BROWN LIMITED, a Company registered under the laws of Great Britain, and JOHN RUPERT BARLOW, British Subject, both of Phoenix Works, Downing Street, Handsworth, Birmingham, 21, do hereby declare the nature of this invention to be as follows:—

This invention relates to cycle frame lugs, of that kind comprising two tubular members disposed at an angle to one another and adapted to receive adjacent members of the machine frame, such lugs being used, for example, for connecting the head tube of the frame to the top tube and down tube, the angle between the two tubular members of the lug varying according to requirements and the type of frame.

An object of the present invention is to provide a cycle frame lug of the above kind of an improved construction.

A further object of the invention is to provide an improved method of making a cycle frame lug of the kind referred to which enables the manufacture to be quickly and cheaply effected, and which avoids a large number of pressing operations. Moreover apart from the final angling operation, the necessity is avoided of having to use separate press tools for each different angle at which the two tubular members of the lug are to be disposed.

A further object is to provide a cycle frame ahead of an improved and novel construction.

According to the invention, a cycle frame lug of the kind referred to comprises two parts, namely a trough-shaped or semi-circular sectioned part having its edges applied against, and welded to, the corresponding edges of an opposed trough-shaped or semi-circular sectioned part from which has been pressed or drawn an integral sleeve or socket disposed at a suitable angle and constituting one of the tubular members of the lug, the two applied-together semi-circular sectioned or trough parts forming the other tubular member of the lug.

Also, according to the invention, a method of manufacturing a cycle frame lug of the kind referred to, consists in forming it from two separate parts or blanks; shaping or pressing the one part or blank into a semi-circular section or trough shape, producing from the other part or blank, such as by a drawing operation, an integral sleeve or socket, constituting the one tubular member of the lug, and fashioning the remaining portion of the said part or blank into a semi-circular section or trough shape, and displacing the said semi-circular sectioned or trough part relatively to the integral sleeve or socket to bring it at the desired angle thereto; applying the edges of the two semi-circular sectioned or trough portions together and securing them by welding, so that they together form the other tubular member of the lug.

Further, according to the invention, a cycle frame head comprises top and bottom lug elements each comprising a semi-circular sectioned part set at an angle to an integral sleeve or socket adapted to receive a tube of the machine frame, the edges of the semi-circular sectioned portions of the two lug elements being respectively joined to the edges of the opposite end portions of a common opposed trough member constituting the front of the opposed head-tube of the machine frame, the edges of the remaining middle portion of the said trough member being joined to the edges of an opposed but shorter trough member which completes the head-tube and lies

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between the said top and bottom lug elements.

Thus, in carrying out the invention, as described in connection with a top head lug of a cycle frame, for connecting the head tube to the adjacent top tube, the improved lug is made from two substantially rectangular sheet metal blanks. One of these blanks is fashioned, by a pressing operation, into a semi-circular section or trough shape, whilst pressed down from the centre of the other blank is a shallow circular cup. By a further operation the latter is deepened, and the centre of the bottom of the cup is then pierced to make a small aperture. The cup is then drawn out, such as by forcing one or more balls through the aperture, into an open-ended sleeve or socket constituting one of the tubular members of the lug and adapted to receive the top tube of the machine frame, the drawing operation incidentally imparting a tapered formation to the wall of the sleeve, which is of a progressively decreasing thickness towards its outer end. After the sleeve or socket has been drawn out of the flat blank in this manner the remaining portion of the blank is acted upon by a press tool and is fashioned into a semi-circular section or trough shape, which forms the counterpart of the first pressed-up blank. This semi-circular sectioned or trough shaped portion of the blank is, preferably by a further operation, then displaced in a suitable machine relatively to the sleeve or socket portion of which it forms an integral part, whilst the sleeve or socket portion is firmly held, until the said trough portion assumes the desired angle relatively to the sleeve or socket portion, according to the type of frame. The longitudinal edges of the semi-circular sectioned or trough shaped part formed from the first blank are now applied to the corresponding longitudinal edges of the similarly-shaped portion of the sleeve or socket carrying part, and the said applied-together edges are secured together by welding, preferably by flash-butt-welding. The concave faces of the two said semi-circular sectioned or trough portions are opposed to one another and the said portions together constitute the other tubular member of the lug, that is the main tubular member for receiving the head tube.

The improved lug may be quickly and cheaply manufactured, and, when completed, possesses considerable strength, whilst the manufacture of the lug, whatever the angle of the socket tube to the main tube, calls for only one set of tools prior to the angling operation, for which a separate tool is needed, depending upon the type of frame, and the purpose for which the lug is to be used.

The application of the invention to a bottom head lug is substantially the same as above described.

In applying the invention to a seat lug of a cycle frame the tubular member for receiving the seat tube would be provided with the usual apertured ears for receiving a clamping bolt, the ears being carried by a trough shaped part to which the opposed trough portion carrying the sleeve or socket is welded. The said ear-carrying trough part may be formed in pairs by dividing two applied-together pressed-up metal blanks, in the manner described in the Specification of our concurrent Patent Application No. 12693/48 (Serial No. 635,884).

According to a modified form of the invention, as applied to the head of a cycle frame, the said head comprises top and bottom lug elements each consisting of a semi-circular sectioned portion and an integral sleeve or socket part formed, in the manner above described, by a pressing and drawing operation, the sleeve or socket constituting a tubular member for receiving the top tube or the down tube of the cycle frame, as the case may be. The said semi-circular sectioned portions of the top and bottom lug elements, however, are lengthened at their opposed ends, and are welded end to end to form also the back half of the head-tube, the two lugs being completed by a common opposed trough-shaped part which, at the same time, forms the front of the head- tube, the side edges of the semi-circular sectioned portions of the two lug elements being applied to the respective edges of the said trough-shaped part and being secured thereto by welding, such as by flash-butt-welding.

Or, as an alternative, the semi-circular sectioned portions of the two sleeve-carrying lug elements may be of normal length, and may be welded respectively to the edges of opposite end portions of a common opposed trough-shaped part, which completes the top and bottom lugs and also forms the front of the head-tube, the latter, in this case, being completed by a shorter trough member the edges of which are applied against the edges of the middle portion of the first trough member and likewise secured thereto by welding, preferably flash-butt-welding, the said shorter trough member fitting closely between the two lug elements, and having its opposite ends welded to the respective elements, so as to provide a rigid unitary structure comprising a head-tube and two lug elements.

By making the head-tube according to either of the arrangements described, the front part of the tube may be provided with cut-away portions for decorative purposes more readily than is possible where there is a central welded joint extending longitudinally down the front of the head-tube, since the cut-away portions may be stamped out of the blank for forming the front part of the head-tube.

Dated this 7th day of May, 1948.
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24, Temple Row, Birmingham, 2,
Agents for Applicants.

COMPLETE SPECIFICATION

Improvements in, or relating to, Cycle Frame Lugs, and in the Method of Manufacture thereof

We, WALTON AND BROWN LIMITED, a Company registered under the laws of Great Britain, and JOHN RUPERT BARLOW, British Subject, both of Phoenix Works, Downing Street, Handsworth, Birmingham, 21, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to cycle frame lugs, of that kind comprising two tubular members disposed at an angle to one another and adapted to receive adjacent members of the machine frame, such lugs being used, for example, for connecting the steering-head tube of the frame to the top tube and down-tube, the angle between the two tubular members of the lug varying according to requirements and the type of frame.

Such cycle frame lugs have hitherto been formed in one or other of the following ways:—

1. As one-piece malleable castings. This method has the following disadvantages:—

(a) In order to assure the ready flow of metal during casting, the metal has in some places to be thicker than is necessary to obtain the required strength at such places, and the finished lug is accordingly unnecessarily heavy.

(b) It is necessary to machine the bores of the tubular members of the lug after casting.

(c) The bores of the tubular members of the lug must be machined at an accurate angle relatively to one another. Also, due to distortion of the casting during the heat treatment to which malleable castings are subjected, it is often found that the wall of a tubular member is, after machining, dangerously thin and weak.

(d) The surface of the casting is rough and uneven and must be filed or polished before enamelling.

(e) The castings are costly to manufacture.

2. From a single metal blank from which one tubular member has been pressed or fashioned, the partly shaped blank being then bent up to form the other tubular member. This method has the following disadvantages:—

(a) The portion of the tubular member formed by the middle of the bent-up blank has a tendency to flatten.

(b) A considerable proportion of the metal has to be removed from the metal strip from which the blank is formed in order to shape the latter. This removed metal has been wasted.

(c) A different set of tools has to be employed for each different angle between the two tubular portions.

(d) The welding of the edges of the bent-up blank has to be effected by acetylene welding, which is a relatively slow and expensive process requiring the employment of skilled labour. It will be appreciated that it is not possible to form this weld by electric resistance butt-welding, since

(i) The welding current would be short-circuited through the body of the lug.

(ii) Excessive wear would be caused in one or both of the electrode dies due to the relative movement between the body of the lug and the die or dies as the gap between the edges of the bent-up blank is closed.

(iii) The blank would have to be bent accurately to shape before being placed in the electrode dies since any inaccuracy in its curvature might set undesirable electrical resistance between the metal of the blank and the electrode.

(e) It is impossible to prevent thinning of the metal at the junction of the two tubular members, with consequential reduction of strength at a part at which there is a concentration of stress. To overcome this defect it is a common practice to insert strengthening liners in-

side the tubular members.

3. From two pressed-up metal blanks welded together and each constituting a half-section of a lug divided in the plane of the cycle frame. This method has the following disadvantages in addition to those set forth in paragraphs 2 (b), 2 (c) and 2 (e) above:

(a) Two complete sets of tools, right-and-left hand, have to be provided for the pressing up of the two metal blanks, and, if electric resistance welding is employed, two sets of electrode dies for every variation of angle between the tubular members.

(b) It is impossible to provide adequate means for clamping the two halves in the respective electrode dies of the welding device.

The object of the present invention is to provide an improved, novel and cheaper, method of making a cycle frame lug of the kind referred to which reduces the number of operations involved, compared with pressed steel lugs hitherto constructed, and which has none of the above disadvantages, besides enabling modern methods of electric resistance butt-welding, particularly flash-butt-welding to be used. The improved method is especially suitable for mass or line production of the lugs, so that the cost of manufacture is considerably reduced, the lug resulting from the improved method of manufacture being stronger than, or at least as strong as, lugs formed as malleable castings, without the disadvantages of malleable castings, as hereinbefore set out.

A further object is to provide a cycle frame lug of an improved and novel construction.

According to the invention, a method of manufacturing a cycle frame lug of the kind referred to, consists in forming it from two separate metal plates or blanks by pressing the one plate or blank into a semi-circular section or open-ended trough shape and producing from the other plate or blank, by a pressing and drawing operation, an integral sleeve or tube, constituting the one tubular member of the lug, and pressing the remaining portion of the latter plate or blank into a semi-circular section or open-ended trough shape, and displacing the said semi-circular sectioned or trough part and the integral sleeve or tube of the latter plate or blank angularly relatively to one another; applying the side edges of the two semi-circular sectioned or trough portions together and uniting them by electric resistance butt-welding, so that together they form the other tubular member of the lug. The said edges may be joined by electric flash-butt welding or by electric percussion welding.

Also, according to the invention, a cycle frame lug of the kind referred to is made from two separately-formed metal pressings, namely an open-ended trough-shaped part and an opposed open ended trough-shaped part from which has been pressed and drawn an integral sleeve or tube disposed at a suitable angle thereto and constituting one of the tubular members of the lug, the side edges of the two trough-shaped parts being joined together by electric resistance butt-welding, so that together they form the other tubular member of the lug.

Figure 1 of the accompanying drawings represents a perspective view of a cycle frame top head-lug constructed from two metal pressings in accordance with this invention, the dotted lines indicating the welded joints.

Figure 2 shows the two parts of the lug before being welded together.

Figure 3 is a plan view of the metal blank for forming the smaller part of the lug.

Figure 4 represents a plan of the blank shown in the preceding figure after it has been pressed up to an open-ended trough shape; whilst Figure 5 is an end view of the said pressed-up blank.

Figure 6 is a plan view of the metal blank for forming the other part of the lug.

Figure 7 shows a plan view of the latter blank after it has been subjected to an initial pressing operation; whilst Figure 8 is a section on the line VIII—VIII, Figure 7, showing the cup formation produced.

Figure 9 illustrates a sectional view of the pressing after the cup has been deepened by a further operation.

Figure 10 is a sectional view of the pressing after the bottom of the cup has been pierced.

Figure 11 is a plan view of the pierced cup-shaped pressing.

Figure 12 is a sectional view of the pressing shown in the next preceding figure, in position between top and bottom dies ready for the next operation.

Figure 13 is a view of the pressing still in the bottom die, after being operated upon by the top die.

Figure 14 shows a sectional view of the completed pressing ready for welding to the pressing shown in Figures 4 and 5.

Figure 15 is a view of the metal strip from which the blanks for forming the one part of the lug are cut.

Figure 16 shows how the blanks for forming the other part of the lug are cut

from a single metal strip with only a small waste of material.

Figure 17 shows an old method of producing blanks for forming one-piece pressed-up lugs.

Figure 18 is a perspective view illustrating the application of the invention to a cycle frame seat lug.

Referring to Figures 1 to 14 of the drawings the improved lug, which is for securing the top tube of a cycle frame to the steering-head tube, is made from two separate metal pressings 1 and 2. The smaller pressing 1 is made from a flat rectangular metal blank *a* shown in Figure 3, the said blank being fashioned into the open-ended, circular-sectioned trough formation shown in Figures 4 and 5 by a simple pressing operation. The other pressing 2 is made from a slightly larger flat metal blank *b* shaped as illustrated in Figure 6. This blank is operated upon by suitable dies so that there is pressed out of the centre of the blank a shallow cup 3 of the form shown in Figures 7 and 8, the cup 3 being deepened, as shown in Figure 9, by a subsequent pressing operation. The bottom of the cup 3 is now pierced with an aperture 4, as shown in Figures 10 and 11, and the pressing, thus formed, is placed between top and bottom dies 5 and 6 (Figure 12). The bottom die 6 is formed with an open-ended trough part 7 with an inclined, and transversely curved, bottom 8, into which opens a vertical socket 9, the top edge 10 of each side of the trough portion of the said bottom die forming a support for the cup-shaped pressing, as illustrated. The top die 5 has a curved portion 11, which is the counterpart of the trough 7 of the bottom die, and from the said curved portion depends a circular shank 12 having a rounded lower end.

As the top die 5 descends on to the work, supported in the manner shown in Figure 12, it draws out the cup 3 into the open-ended sleeve or tube 13 shown in Figure 13, and simultaneously presses the remaining part of the pressing into the open-ended trough portion 14, the latter, which is of a semi-circular section being disposed at an angle to the tube 13, according to requirements, this angle depending on the inclination of the bottom 8 of the bottom die 6. As the top tool 5 leave the bottom die the pressed and drawn part is left in the form shown in Figure 13, and is complete except for shearing. The pressing removed from the bottom die is shown, after shearing, in Figure 14, in section, and it will be noted how the wall of the sleeve or tubular part 13 is of a tapered formation, progressively decreasing in thickness towards its outer end. Also, the metal at the corners or root end of the tubular part 13 is thickened, instead of being weakened at this point, which may occur in cycle lugs formed from pressings according to other methods.

The longitudinal edges 15 of the semi-circular sectioned or trough shaped part 1 formed from the first blank *a* are now applied to the corresponding longitudinal edges 16 of the similarly-shaped portion 14 of the part carrying the sleeve or tube 13, and are secured together by flash-butt-welding or percussion welding. The concave faces of the two said semi-circular sectioned or trough portions 1 and 14 are opposed to one another and the said portions together constitute the other tubular member of the lug, that is the main tubular member which forms part of the steering-head

The improved lug may be cheaply manufactured without undue waste of metal. As will be seen from Figure 15, the blanks *a* for forming the front open-ended trough part 1 of the lug may be cut off from a single metal strip 17 without any surplus metal being left over, whilst the blanks *b* for forming the other part of the lug may be cut off from a similar, but wider, strip 18, shown in Figure 16. In this latter case the waste metal is indicated at 19 by the shaded portions. When the lug is formed from a single blank (instead of from two separate blanks) in accordance with a known method of making such lugs, the blank has been of the shape indicated at *c* in Figure 17. In this case it is obvious that the waste metal indicated by the shaded portion at 20, is much greater. It is estimated that the present method of making the lug from two separate blanks effects a saving of metal equal to 17% of the metal used in making a similar lug according to the old method, from a single blank of the form shown in Figure 17. The metal required for the blanks for producing the lug by the present method is also considerably less than that required where the lug is formed in two parts, with the joint lying in the plane of the machine frame.

Not only does the present improved method of making the lug effect a substantial saving of metal, but the lug is particularly adapted for mass production by flash-butt-welding or percussion welding, since the two parts may be readily located in the electrodes and correctly aligned, so that the edges to be welded may be easily brought into contact. The joints, when completed, are sound and homogeneous, and the electrodes being of

a simple form are easily replaceable.

The method of making cycle frame head lugs from two pressed-up sheet metal halves electrically welded together, with the joint lying in the plane of the lug and in the plane of the cycle frame, has not been successful, owing to the expense of making and replacing the electrodes, and because special tools have been necessary for each stage in the production of each half of each lug for each different angle required. Moreover, in this construction the joint has extended longitudinally along the sides of the branch tube or socket, but with the present method the branch tube is seamless, and, being drawn, is of much greater strength.

According to the present method of forming the lug, the front part of the latter, formed from the blank *a* is of a simple trough or channel section and is the same for all lugs which have a common diameter. The operations for forming the other portion of the lug from the blank *b* are common up to the angling operation, regardless of the angle of the branch tube. The tools required are extremely simple and the electrodes for the flash-butt welding or percussion welding are, because of their simple form, cheaply and easily replaceable.

A very important advantage is that owing to the lug being formed from two parts in the manner described, and owing to the extreme simplicity of the pressing operations, it is an easy matter to thicken or strengthen the lug at any points desired. The whole lug may, in fact, be easily made of any desired thickness which permits of either of the tubular parts of the completed lug being drawn out by a subsequent operation or operations to any extent required, within certain limits depending on the initial thickness of the walls of such tubular parts, so that either part may be made of any desired length.

The front part 1 of the lug may be provided with cut-away portions for decorative purposes more readily than is possible where there is a central welded joint extending longitudinally down the front of the lug, since the cut-away portions may be easily stamped out of the blank *a* before the latter is pressed up to the required trough shape, or during the pressing operation.

The upper end of the main tube of the lug may be cupped, if desired, to receive a ball race.

The application of the invention to a bottom head lug, or to a middle lug for a lady's cycle frame, is substantially the same as above described.

In Figure 18 the invention is shown applied to a seat lug for a cycle frame, wherein the tubular member for attachment to the seat tube of the machine frame comprises an open-ended trough part 14 with an integral drawn-out branch tube 13, and an opposed trough part 21 provided with a pair of ears 22 for receiving a clamping bolt, the sides edges of the two trough parts being secured together by flash-butt-welding and the joints being indicated by the dotted lines at 23. The part 14, with the branch tube is made from a single blank as previously described, but the ear-carrying trough part 21 is preferably formed by transversely dividing two welded together pressed-up metal blanks, in the manner described in the Specification of our concurrent Patent Application No. 12693/48 (Serial No. 635,884). If desired, the ear-carrying trough part may be formed by other means.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—

1. The method of manufacturing a cycle frame lug of the kind referred to, consisting in forming it from two separate metal plates or blanks by pressing the one plate or blank into a semi-circular section or open-ended trough shape, and producing from the other plate or blank, by a pressing and drawing operation, an integral sleeve or tube, constituting the one tubular member of the lug, and pressing the remaining portion of the latter plate or blank into a semi-circular section or open-ended trough shape and displacing the said semi-circular sectioned or trough part and the integral sleeve or tube of the latter plate or blank angularly relatively to one another; applying the side edges of the two semi-circular sectioned or trough portions together and uniting them by electric resistance butt-welding, so that together they form the other tubular member of the lug.

2. The method of manufacturing a cycle frame lug of the kind referred to, consisting in forming it from two separate metal plates or blanks by pressing the one plate or blank into a semi-circular section or open-ended trough shape, and producing from the other plate or blank, by a pressing and drawing operation, an integral sleeve or tube, constituting the one tubular member of the lug, and pressing the remaining portion of the latter plate or blank into a semi-circular section or open-ended trough shape and displacing the said semi-circular sec-

a simple form are easily replaceable.

The method of making cycle frame head lugs from two pressed-up sheet metal halves electrically welded together, with the joint lying in the plane of the lug and in the plane of the cycle frame, has not been successful, owing to the expense of making and replacing the electrodes, and because special tools have been necessary for each stage in the production of each half of each lug for each different angle required. Moreover, in this construction the joint has extended longitudinally along the sides of the branch tube or socket, but with the present method the branch tube is seamless, and, being drawn, is of much greater strength.

According to the present method of forming the lug, the front part of the latter, formed from the blank *a* is of a simple trough or channel section and is the same for all lugs which have a common diameter. The operations for forming the other portion of the lug from the blank *b* are common up to the angling operation, regardless of the angle of the branch tube. The tools required are extremely simple, and the electrodes for the flash-butt welding or percussion welding are, because of their simple form, cheaply and easily replaceable.

A very important advantage is that owing to the lug being formed from two parts in the manner described, and owing to the extreme simplicity of the pressing operations, it is an easy matter to thicken or strengthen the lug at any points desired. The whole lug may, in fact, be easily made of any desired thickness which permits of either of the tubular parts of the completed lug being drawn out by a subsequent operation or operations to any extent required, within certain limits depending on the initial thickness of the walls of such tubular parts, so that either part may be made of any desired length.

The front part 1 of the lug may be provided with cut-away portions for decorative purposes more readily than is possible where there is a central welded joint extending longitudinally down the front of the lug, since the cut-away portions may be easily stamped out of the blank *a* before the latter is pressed up to the required trough shape; or during the pressing operation.

The upper end of the main tube of the lug may be cupped, if desired, to receive a ball race.

The application of the invention to a bottom head lug, or to a middle lug for a lady's cycle frame, is substantially the same as above described.

In Figure 18 the invention is shown applied to a seat lug for a cycle frame, wherein the tubular member for attachment to the seat tube of the machine frame comprises an open-ended trough part 14 with an integral drawn-out branch tube 13, and an opposed trough part 21 provided with a pair of ears 22 for receiving a clamping bolt, the sides edges of the two trough parts being secured together by flash-butt-welding and the joints being indicated by the dotted lines at 23. The part 14, with the branch tube is made from a single blank as previously described, but the ear-carrying trough part 21 is preferably formed by transversely dividing two welded together pressed-up metal blanks, in the manner described in the Specification of our concurrent Patent Application No. 12693/48 (Serial No. 635,884). If desired, the ear-carrying trough part may be formed by other means.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—

1. The method of manufacturing a cycle frame lug of the kind referred to, consisting in forming it from two separate metal plates or blanks by pressing the one plate or blank into a semi-circular section or open-ended trough shape, and producing from the other plate or blank, by a pressing and drawing operation, an integral sleeve or tube, constituting the one tubular member of the lug, and pressing the remaining portion of the latter plate or blank into a semi-circular section or open-ended trough shape and displacing the said semi-circular sectioned or trough part and the integral sleeve or tube of the latter plate or blank angularly relatively to one another; applying the side edges of the two semi-circular sectioned or trough portions together and uniting them by electric resistance butt-welding, so that together they form the other tubular member of the lug.

2. The method of manufacturing a cycle frame lug of the kind referred to, consisting in forming it from two separate metal plates or blanks by pressing the one plate or blank into a semi-circular section or open-ended trough shape, and producing from the other plate or blank, by a pressing and drawing operation, an integral sleeve or tube, constituting the one tubular member of the lug, and pressing the remaining portion of the latter plate or blank into a semi-circular section or open-ended trough shape and displacing the said semi-circular sec-

* C L M S *

tioned or trough part and the integral sleeve or tube of the latter plate or blank angularly relatively to one another; applying the side edges of the two semi-circular sections or trough portions together and uniting them by electric flash-butt-welding, so that together they form the other tubular member of the lug.

3. The method of manufacturing a cycle frame lug of the kind referred to, consisting in forming it from two separate metal plates or blanks by pressing the one plate or blank into a semi-circular section or open-ended trough shape, and producing from the other plate or blank, by a pressing and drawing operation, an integral sleeve or tube, constituting the one tubular member of the lug, and pressing the remaining portion of the latter plate or blank into a semi-circular section or open-ended trough shape and displacing the said semi-circular sectioned or trough part and the integral sleeve or tube of the latter plate or blank angularly relatively to one another; applying the side edges of the two semi-circular sectioned or trough portions together and uniting them by electric percussion welding, so that together they form the other tubular member of the lug.

4. A cycle frame lug of the kind referred to made from two separately-formed metal pressings, namely, an open-ended trough-shaped part and an opposed open-ended trough-shaped part from which has been pressed and drawn an integral sleeve or tube disposed at a suitable angle thereto and constituting one of the tubular members of the lug, the side edges of the two trough-shaped parts being joined together by electric resistance butt-welding, so that together they form the other tubular member of the lug.

5. A cycle frame seat lug of the kind referred to made from two separately-formed metal pressings, namely, an open-ended trough-shaped part provided with a pair of spaced-apart ears and an opposed open-ended trough-shaped part from which has been pressed and drawn an integral sleeve or tube disposed at a suitable angle thereto and constituting one of the tubular members of the lug, the side edges of the two trough-shaped parts being joined together by electric resistance butt-welding so that they together form the other tubular member of the lug.

6. A cycle frame lug as claimed in claim 4 or 5, wherein the parts of the lug are joined together by flash-butt-welding.

7. A cycle frame lug as claimed in claim 4 or 5, wherein the parts of the lug are joined together by electric percussion welding.

8. The method of making a cycle frame lug as herein described with reference to Figures 1 to 16 of the accompanying drawings.

9. A cycle frame lug made by the method herein described with reference to Figures 1 to 16, or Figure 18, of the accompanying drawings.

Dated this 30th day of May, 1949.
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24, Temple Row, Birmingham, 2,
Agents for Applicants.

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