J. E. BIRDSALL.

LECTRICAL GROUNDING CLAMP.

APPLICATION FILED AUG. 17, 1915.

1,219,228.

Patented Mar. 13, 1917.

Fig. 1.

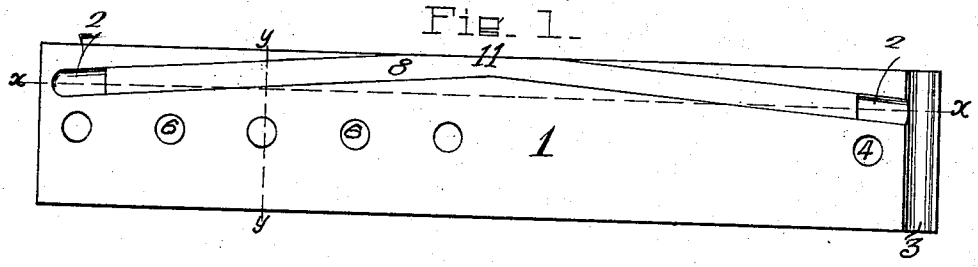


Fig. 2.

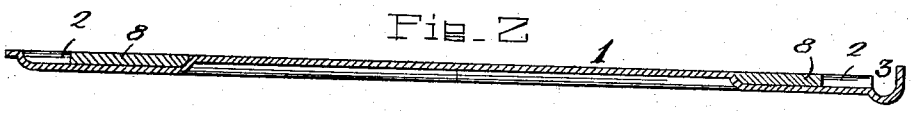


Fig. 3.

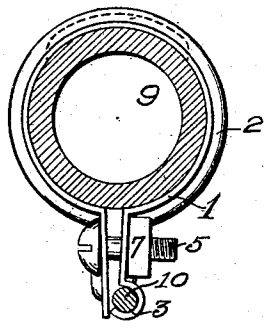
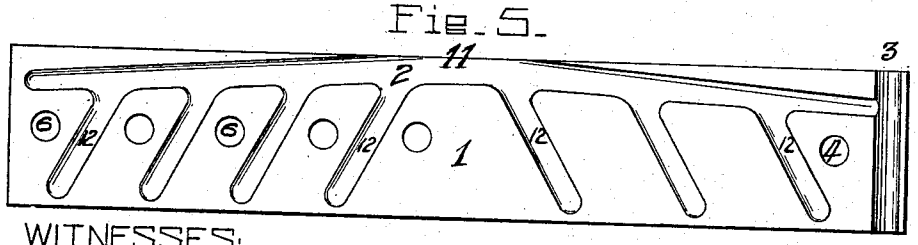


Fig. 4.



Fig. 5.



WITNESSES:

L. J. Martin.

S. L. Comben

James Elbert Birdsall INVENTOR.

by Thos. J. Martin Jr.

ATTORNEY.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JAMES ELBERT BIRDSALL, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO WILLIAM GIBSON.

ELECTRICAL GROUNDING-CLAMP.

1,219,228. Specification of Letters Patent. Patented Mar. 13, 1917.

Application filed August 17, 1915. Serial No. 45,946.

To all whom it may concern:

Be it known that I, JAMES ELBERT BIRDSALL, a citizen of the United States, residing at No. 166 North Farson street, Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Electrical Grounding-Clamps, of which the following is a specification.

My invention relates to attachments for forming ground connections for electric circuits, and has for its objects to provide, first, a reliable and efficient device for connecting, both mechanically and electrically, the circuit with a pipe or conduit or other grounded conductor, and second, a ready means for securely attaching and retaining the same in position, whereby all tendency to loosening or shifting may be obviated.

For the purpose of illustrating my invention I have described and shown in the accompanying drawings one form thereof which is at present preferred by me, although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not to be limited to the precise form, arrangement, and organization as herein shown and described except as may be limited by the claims.

Figure 1, is a plan view of my invention; Fig. 2, a longitudinal section on line *x—x;* Fig. 3, an end view of it attached to a conductor; Fig. 4, a transverse section on line *y—y;* and Fig. 5, a plan view of a modification showing channels before application of solder. Similar numerals refer to similar parts throughout the several views.

As trouble is frequently experienced by reason of the gradual working loose of ground clamping connections, due to vibration or other causes, I aim in this invention to overcome this objection by a novel application of soldering material. And, as it has proved in practice in the majority of cases a difficult operation to make a good joint by the usual methods of soldering, owing to generally unfavorable locations and conditions encountered in making ground connections, I have overcome this difficulty most effectually by producing a device that is substantially self-soldering by the mere application of heat after the parts are joined and in place.

To accomplish this I employ a relatively broad band of metal, preferably copper by reason of its high heat conductivity. This band, 1, is impressed with a channel, or channels 2, 12, and a furrow, 3, adapted to receive the wire, 10, from the circuit. A hole, 4, to receive a bolt, 5, is made in the band adjacent to the furrow 3, and several holes, 6, are likewise punched in the band to facilitate its ready adjustment to various sized conductors, by use of the bolt 5 and nut 7.

The channel 2, is adapted to contain a supply of solder 8 ready to be fused. In Fig. 5 this channel is shown with branches, 12, to increase distribution when desired. These channels may be partially or completely filled flush as shown in Fig. 1 with solid solder 8 before installation according to the character of the conductor to be employed and the nature of desired joint. In some cases it may be preferable to have the solder deposit extend beyond the plane of the contacting surface of the band, 1, as shown in Fig. 4, so that while the solder is fused the band may be further tightened on the conductor and thus spread and squeeze the solder into very intimate contact with both band and conductor. Where the channel intersects the edge of the band, as seen at 11, an orifice is formed, shown in broken line curve, Fig. 3, thus permitting the introduction of additional solder after clamping when expedient. Regarding the installation of the solder material my design is that, in one form of the device, it may be applied and secured within the channel at the time of manufacture; or, in the form of wire, rod or tape, it may be furnished loose with the clamp, to be distributed in the quantity and form desired by the user at the time of application of the joint. In either case the result is the same, *i. e.* the solder in a solid state will be retained within the channel 2 adjacent to the conductor 9 when the band 1 is applied to the conductor and the nut screwed in place.

It will be observed that the channel 2 leads to and communicates with the furrow 3 which holds the circuit wire 10. The object of this is to provide a ready means of flow

for the molten solder so that some of it will reach the wire of the circuit and thus secure it to the band upon cooling. Furthermore the channel 2 is so inclined as to afford a means of gravitation of the molten metal where the connection is made to a vertical conductor.

The mode of use of my invention is as follows:—

The conductor, 9, is cleaned and scraped and a suitable flux applied, the band 1 containing the soldering material is brought about it so that the solder lies between the two. The bolt 5 is then inserted through the appropriate hole 6 and the hole 4, the nut applied, the band adjusted to its exact position, and the bolt and nut tightened up so as to hold the parts well and snug. Flux is then applied to the curve 3 and the wire to be grounded inserted, the furrow being closed about the wire to retain it. The torch is then brought into use and the flame directed to the band and carried back and forth longitudinally until the solder flows freely and reaches the desired locations on the conductor and into the furrow 3 around the wire 10. An extremely fine, tight joint can be made by further tightening the nut and bolt while the flame is being applied whereby advantage is taken of the temporary expansion of the band due to the heat followed by the contraction due to cooling. By intelligent use of the torch, thus, in combination with accompanying adjustments of the nut and bolt, the solder may be controlled so as to flow exactly as desired and a very elegant connection, electrically and mechanically, secured.

I am aware that prior to my invention ground clamps have been made with bands having holes and secured about a conductor by a bolt and nut. I therefore do not claim such a combination broadly; but

I claim:

1. In a device of the character described, in combination, a band, a deposit of solder lodged therein, means to direct the flow of said solder when fused and means for holding said band about a conductor.

2. In a device of the character described, in combination, a band, intercommunicating channels therein, each channel being closed at one end, and means for holding said band about a conductor.

3. In a device of the character described, in combination, a band, a receptacle therein to retain solid solder, channels therein to direct the flow of said solder when fused and means for holding said band about a conductor.

4. In a device of the character described, in combination, a band, a receptacle therein to retain solid solder, a furrow shaped in said band adapted to receive a wire, a channel in said band leading to said curve and means for clamping said band about a conductor.

5. In a device of the character described, in combination, a band, a solder receptacle therein, a wire retaining furrow therein, channels therein adapted to direct the flow of molten solder, one thereof leading to said curve and means for clamping said band about a conductor.

6. In a device of the character described, in combination, a band, a solder holding formation therein, a wire retaining furrow therein, channels therein adapted, when said band is held around a conductor, to direct molten solder into contact with said conductor and with a wire within said furrow, an orifice to said channels adapted to admit solder and flux and means to hold said band about a conductor, all substantially as and for the purposes described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses, this 8th day of May, A. D. 1915.

JAMES ELBERT BIRDSALL.

Witnesses:

AUGUSTINE C. METZINGER,

L. T. MARTIN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."