Nov. 14, 1967 G. A. SODDERLAND ETAL 3,353,145

ELECTRICAL GROUNDING CLAMP

Filed June 3, 1965 2 Sheets-Sheet 1

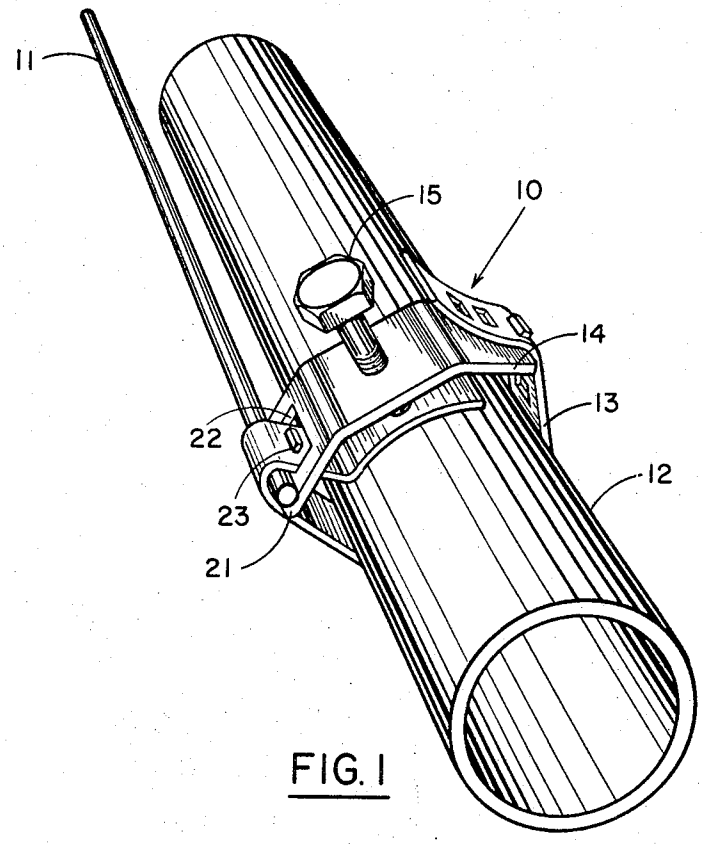



FIG. 1

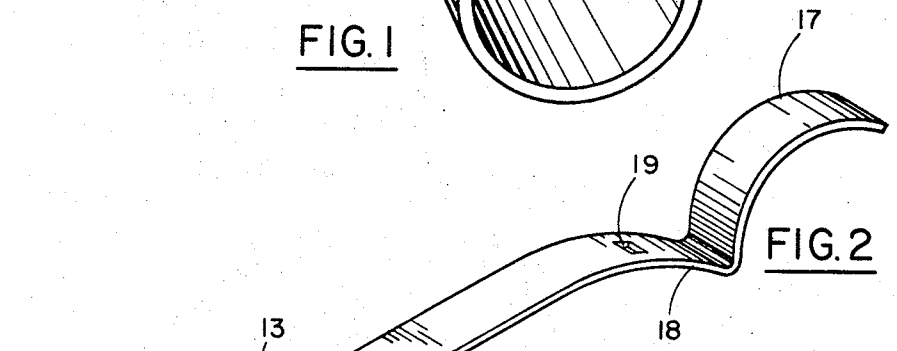



FIG. 2

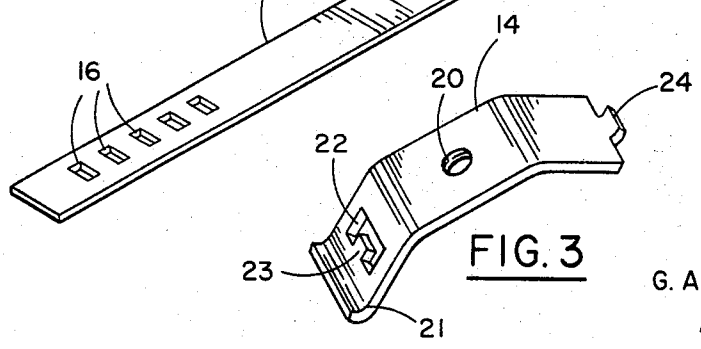



FIG. 3

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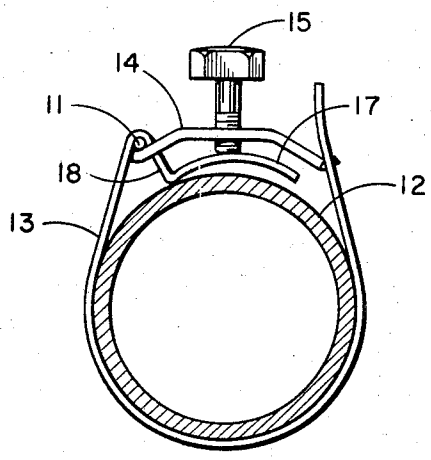



FIG. 4

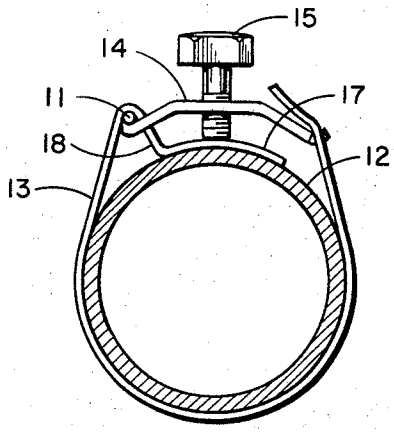



FIG. 5

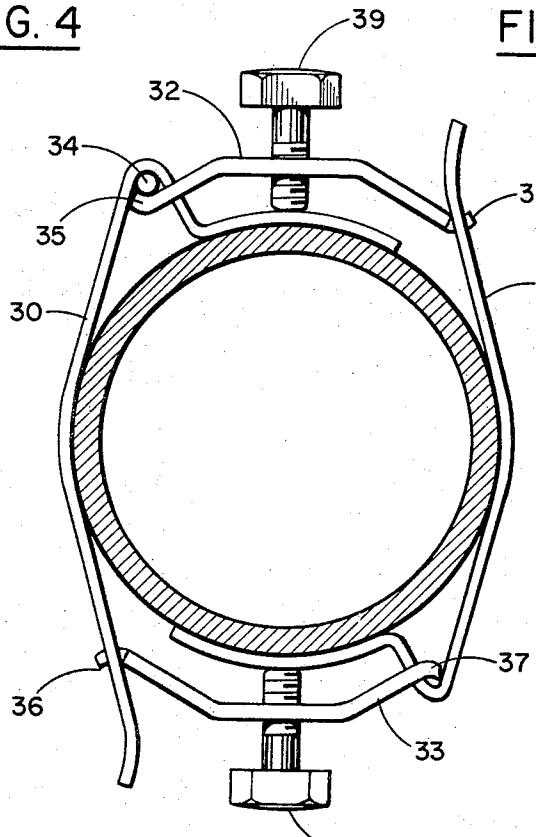



FIG. 6


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# ELECTRICAL GROUNDING CLAMP

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8 Claims. (Cl. 339—249)

## ABSTRACT OF THE DISCLOSURE

The disclosed clamp comprises a strap adapted to embrace a grounded element and a saddle for securing the strap to the grounded element. The saddle is provided with a conductor receiving portion for supporting a conductor disposed thereon and the strap is secured to the saddle in such a way that it overlies the conductor receiving portion. Thus, a conductor positioned at the conductor receiving portion is securely clamped between the saddle and the strap when the latter is tightened around the grounded element.

This invention relates to electrical grounding clamps for connecting conductors to grounded elements such as cold water pipes or the like.

Ground clamps of this type consist of an electrically conductive means generally in the form of a strap adapted to embrace the grounded element and to be secured to a member commonly referred to as a saddle which carries a screw or similar means that bears against the grounded element to tension the strap. In prior art clamps, the conductor was usually connected to the screw. Such arrangements provided relatively poor electrical connection between the conductor and the grounded element because there was little more than point contact between the screw and the ground element. The other electrical path through the strap was interrupted with several surface contacts. The conductivity between the several surface contacts was subject to further impairment due to oxidation of the surfaces. Another disadvantage of the prior art clamp was that the end of the conductor had to be specially formed or provided with a connector for attachment to the clamp.

The drawbacks of the prior art have been overcome as a result of the present invention by providing clamps of this type having a novel and improved electrical connection between the conductor and the grounded element. In accordance with the present invention, the saddle member is provided with a conductor-receiving portion over which the strap passes. Thus, a conductor positioned at the conductor-receiving position is securely clamped between the saddle member and the strap when the latter is tightened around the grounded element.

An advantage of this construction is that the main electrical path from the conductor through the strap to the grounded element includes a minimum number of surface contacts.

Another advantage of the clamp according to this invention is that it has a minimum number of components, is easy to install, and, therefore, is more economical.

Still another advantage of the invention is that two or more clamps may be connected in series to embrace a grounded element which is too large for one clamp. This means that one size of clamp according to this invention can be used on a wide range of sizes of grounded elements simply by connecting several clamps in tandem.

These and other important advantages of the present invention will become more apparent from the following description of preferred embodiments of the invention which refers to the accompanying drawings in which:



FIG. 1 is a perspective view of a clamp in accordance with the invention assembled around a pipe;

FIG. 2 is a perspective view of the strap portion of the clamp;

FIG. 3 is a perspective view of the saddle of the clamp;

FIG. 4 is a side view of the clamp loosely embracing the pipe prior to being tightened around the pipe;

FIG. 5 is a side view of the clamp drawn tightly around the pipe;

FIG. 6 is a side view of two clamps in tandem arrangement.

FIGURE 1 of the drawings illustrates a clamp in accordance with this invention and designated generally by the reference numeral **10**, for connecting a conductor **11** to a grounded element shown as a pipe **12**. Clamp **10** comprises electrically conductive means in the form of a strap **13** adapted to embrace pipe **12**, and means such as the saddle member **14** for securing strap **13** to the pipe. Saddle member **14** engages opposite ends of strap **13** and carries means such as screw **15** for moving the saddle member away from the pipe to tension strap **13**. Saddle **14** and screw **15** may be but need not be made of electrically conductive material.

The preformed strap **13** is shown in FIGURE 2 as it appears before attachment to pipe **12**. Strap **13** may be formed of a single strip of copper or other electrically conductive material and is provided at one end with a plurality of slots **16** spaced longitudinally from each other. Extending from the other end of the strap **10** is a curved portion **17** which conforms approximately to the shape of pipe **12**. Strap **13** further includes an intermediate offset portion **18** and a slot **19** adjacent thereto, the functions of which are described hereinafter.

As shown in FIGURE 3, saddle member **14** is provided with a threaded hole **21** for receiving the screw **15**. Each end of the saddle member is bent downwards to facilitate attachment of the strap **13**. One end of the saddle member **14** has a curved conductor-receiving portion **21** and a slot **22** adjacent thereto. A tab **23** projects into slot **22** from the side thereof next to the curved portion **21**. At the other end of the saddle a tab **24** projects upwards at an angle to the end portion of the saddle member to secure the strap **13** as described below.

When the clamp is applied to pipe **12** as in FIGURE 1, the strap **13** is inserted through slot **22** in saddle member **14** so that the curved portion **17** of the strap lines against pipe **12** under the threaded hole **20** in the saddle member. Strap **13** is secured to saddle member **14** by engagement of tab **23** with slot **19** in the strap. The conductor **11** is then positioned on curved portion **21** of saddle member **14** and strap **13** is bent down over the conductor and around the pipe **12**. The other end of strap **13** is secured to the other end of saddle member **14** by inserting tab **24** in any one of the slots **16** depending on the size of the pipe.

Screw **15** is then screwed into threaded hole **20** of saddle member **14** to bear against the curved portion **17** of the strap. Tightening screw **15** draws the saddle member **14** away from the pipe and tensions strap **13** about the pipe. It is important to note that this also draws the strap **13** tightly over conductor **11** to clamp the conductor between the saddle member **14** and the strap.

The clamp before and after tightening around pipe **12** is illustrated in FIGURES 4 and 5, respectively. As can be seen from FIGURE 5, the offset portion **18** of strap **13** straightens to permit the saddle member **14** to be drawn away from pipe **12** by the action of screw **15** without pulling the curved portion **17** of the strap from its clamped position between the screw and the pipe and thus prevents the screw from skidding off pipe **12**.

It will be realized that while the curved portion **17** of strap **13** is desirable to increase the conductivity between

the strap and pipe **12** and to prevent damage to pipe **12**, this portion is not absolutely essential to the working of the invention and could be eliminated.

FIGURE 6 illustrates a tandem arrangement of the clamp according to this invention in which two straps **30** and **31** are coupled together using saddle members **32** and **33** as connectors. A conductor **34** is positioned on the conductor receiving portion **35** of saddle **32** and strap **30** is bent thereover and secured to tab **36** of saddle member **33**. Strap **31** is then bent around the conductor receiving portion **37** of saddle member **33** and secured to tab **38** of saddle member **32**. Obviously, conductor **34** could equally be positioned on conductor receiving portion **37** of saddle **33**. Either screw **39** or **40**, or both, may then be tightened to secure straps **30** and **31** to the pipe. In this way, one size of strap can be used to accommodate grounded elements which are too large for a single clamp. For larger grounded elements or pipes more clamps may be coupled together. The additional saddle members act simply as couplings and do not require individual clamping screws, although a separate screw may be used with each saddle member if desired.

It is to be understood that other forms of electrically conductive means and saddle members may be used in accordance with the invention. For example, the electrically conductive means adapted to embrace the grounded element may be rigid and may take any shape, the only restriction being that it must overlie a conductor-receiving portion on the saddle member. The shape of the saddle member may also vary and means other than a screw may be used to secure the clamp tightly about the grounded element.

What is claimed is:

**1.** A ground clamp for electrically connecting a conductor to a grounded element comprising a strap adapted to substantially encircle the grounded element, a saddle member engaging opposite ends of the strap and means for moving the saddle member away from the grounded element to tension the strap; one end of said saddle member having a curved portion for receiving the conductor, a slot adjacent the curved portion and a tab projecting into the slot from one side thereof, the strap having a slot for engaging the tab; said strap passing through the slot and over the conductor whereby the conductor is encircled partially by the strap and partially by the saddle member and is thus clamped between the saddle member and the strap when the latter is tightly secured about the grounded element.

**2.** A ground clamp as defined in claim **1** wherein the other end of said saddle member includes a tab projecting therefrom, the strap having a plurality of longitudinally spaced slots for selectively engaging said tab whereby the clamp is adjustable to various sizes of grounded elements.

**3.** A ground clamp as defined in claim **1** wherein the means for moving the saddle member away from the grounded element is a screw which is threaded through the center of the saddle member and adapted to bear against the grounded element.

**4.** A ground clamp as defined in claim **3** wherein the end portion of the strap extending through the slot in said saddle member is clamped against the grounded element by the screw, said extended end portion of the strap having an intermediate offset portion which avoids said saddle member from pulling the end of the strap from its clamped position under the screw when the saddle member is moved away from the grounded element.



**5.** Clamping means for electrically connecting a conductor to a grounded element comprising a plurality of clamps connected in series to encircle the grounded element, each clamp including a saddle member having a conductor receiving portion on one end thereof and a strap secured at one end to said saddle member adjacent said conductor receiving portion, the other end of said strap being secured to the next adjacent saddle member in said series at the end thereof opposite its conductor-receiving end portion, and a screw threadably engaging one of said saddle member and arranged to bear against the grounded element for moving the one saddle member away from the grounded element to tighten the series of clamps; each saddle member having a slot adjacent its conductor receiving portion and a tab projecting into the slot from one side thereof, each strap extending through the slot in said saddle member and having a slot for engaging said tab; at least one of the straps being arranged to overlie the conductor receiving portion of the saddle member associated with said strap whereby a conductor positioned at said conductor receiving portion is clamped between the strap and said associated saddle member when the series of clamps is tightened about the grounded element.

**6.** A clamping means as defined in claim **5** wherein the saddle member associated with said one strap has a curved portion for receiving the conductor, said one strap passing over the conductor and through the slot whereby the conductor is encircled partially by the strap and partially by said saddle member.

**7.** A clamping means as defined in claim **5** wherein the end of each saddle member opposite its conductor-receiving end portion includes a tab projectiong therefrom, each strap having a plurality of longitudinally spaced slots for selectively engaging said tab whereby the clamping means is adjustable to various sizes of grounded element.

**8.** A clamping means as defined in claim **5** wherein the end portion of the strap which extends through the slot in the one saddle member is clamped against the grounded element by the screw, said extended end portion of the strap having an intermediate offset portion which avoids said saddle member from pulling the end of the strap from its clamped positon under the screw when the saddle member is moved away from the grounded element.


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