June 20, 1933. R. H. OLLEY ET AL 1,914,381

GROUNDING DEVICE

Original Filed April 20, 1927

Fig. 1.

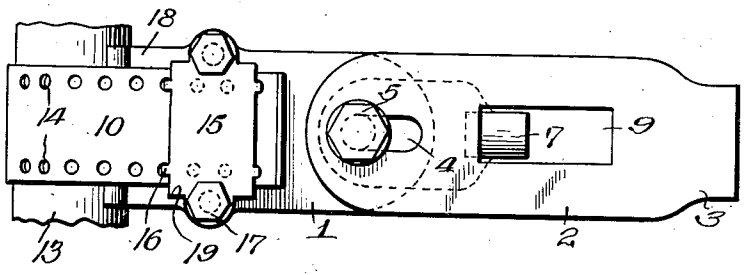


Fig. 4.

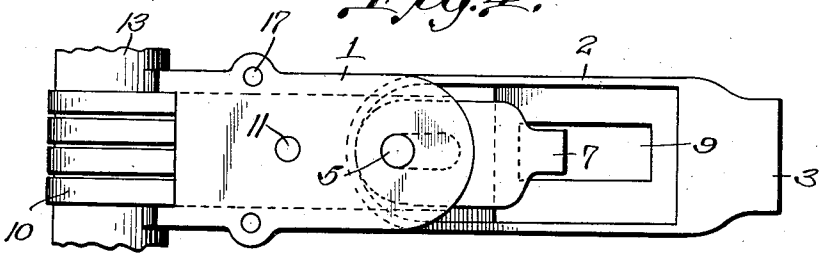


Fig. 2.

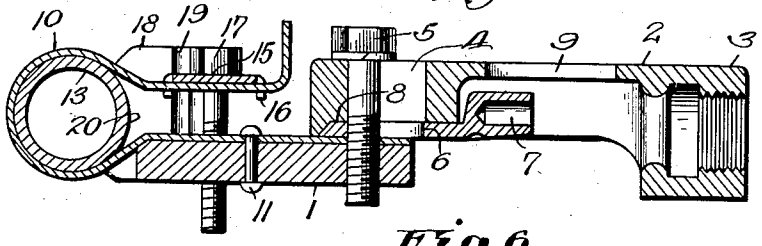


Fig. 6.

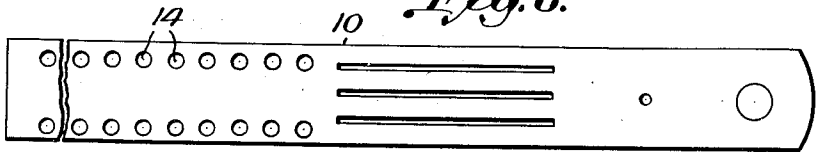
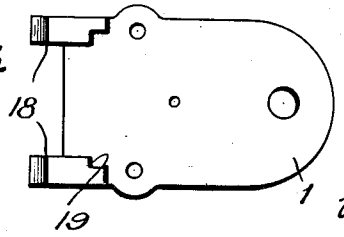


Fig. 3.



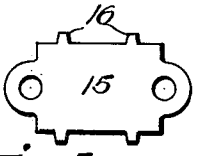


Fig. 5.

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UNITED STATES PATENT OFFICE

RAYMOND H. OLLEY, OF SYRACUSE, NEW YORK, AND STEPHEN W. BORDEN, OF SUMMIT, NEW JERSEY, ASSIGNORS, BY MESNE ASSIGNMENTS, TO STEPHEN W. BORDEN, OF SUMMIT, NEW JERSEY

GROUNDING DEVICE

Original application filed April 20, 1927, Serial No. 185,181. Divided and this application filed May 12, 1928. Serial No. 277,147.

This invention relates to grounding devices of the type shown in Cowles Patent No. 1,491,789 issued April 29, 1924, and has for its object a grounding device in which the body is readily adjustable to conductors or pipes which are not readily displaced from fixed location and are arranged at various angles to each other.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawing in which like characters designate corresponding parts in all the views.

Figure 1 is a plan view of a grounding device embodying this invention.

Figure 2 is a longitudinal sectional view thereof.

Figure 3 is a plan view of one of the sections of the body.

Figure 4 is an inverted plan view of the fitting.

Figure 5 is a detail view of the clamping plate.

Figure 6 is a detail view of the strap for gripping one of the conductors.

This grounding device comprises generally, a body having means for electrical and mechanical connection to different conductors, one of which is a grounded conductor and the other, a conductor to be grounded, these sections having adjustment into different angular relation and also an endwise adjustment whereby the body can be adapted to fixed conductors located at different angles to and different distances from each other.

In the illustrated embodiment of my invention, the body consists of sections 1 and 2 having means for connection to conductors, the sections being here shown as lapping each other and the section 2 being provided with means as an internally threaded nipple 3 for connection to a conductor to be grounded and also formed with a lengthwise slot 4 through which a clamping screw 5 extends which screw threads into the section 1.

The section 2 is also provided with means for connection to a ground wire in case a ground wire is used, this being shown as a binding terminal 6 usually interposed between the lapping surfaces of the sections 1 and 2 and having a part as a head 7 formed with a socket in which a wire can be attached or soldered. The section 2 is usually provided with a recess 2 in one of its faces in which the binding terminal 6 is located. The conductor 6 is also formed with a hole through which the screw 5 extends. The section 2 is in the general form of a channel and the wire engaging head 7 is located within the channel so as not to interfere with the pivotal adjusting movement of the section 2 relatively to the section 1. The channel is preferably formed with a sight or inspection opening 9 in one of its walls as the bottom wall thereof. The section 2 is usually located with its channel inverted so that the bottom 9 in which the slot is formed is presented upwardly.

10 is a flexible metallic strap having one end lapping and secured as by a rivet 11, to the section 1, the strap being designed to form a loop around a grounded conductor 13 and to wrap a sufficient distance around said conductor to form a good electrical and mechanical joint. In order that the strap 10 may rap a sufficient distance around the conductor 13 irrespective of its size, a gripping element 15 is provided for detachably interlocking with the free end of the strap 10, and this plate 15 is clamped to the body or section 1 by screws as 17.

As the plate 15 is forced downward by turning the screws 17 as it is desirable that its movement be limited to a path having a definite distance from the conductor 13 in order to insure a definite amount of adjustment of the strap 10 for a given amount of travel of the plate 15. This is accomplished by means of the rigid upright portions 18 having guide grooves at 19 against which the plate is drawn by the strap 10. Furthermore, the grooves 19 and plate 15 are so shaped and coact as to prevent any transverse movement of the plate 15, thus insuring an even tension across the entire width of the strap 10. As the plate is moved downward to increase the tension

of the strap 10, there is no relative movement of the strap and any portion of the tightening device in mechanical contact therewith, such relative movements in other devices always acting to cut or tear the strap. If the rigid guides 18 were not present, the entire tension of the strap would be transmitted to the screws 17 in the form of a side pressure applied at the tops of the screws. Such a pressure produces so much friction that it is possible to utilize effectively but a relatively small portion of the power of the screw and furthermore, the screw is liable to be bent by the strain and the accuracy of the adjustment thereby impaired. It frequentiy happens that in devices having no guides, the screws are either broken due to binding or twisted off in an effort to secure the desired amount of tension on the strap.

The vertical projections 18 are formed with circular arc shaped seats 20 for coacting with the conductors 13 and also the points of the arc project beyond the end of the body proper.

In the illustrated embodiment of our invention, the strap is formed with a series of holes 14 along each margin thereof and the plate 15 is interlocked with the strap 10 by means of prongs 17 which extend through the holes 14. The clamping members 17 extend through the plate 15 and thread into the section 1 on opposite sides of the strap 10.

It is obvious that by placing two prongs of the plate 15 in various of the marginal holes in the strap 10, conductors 13 of varying diameters may be firmly gripped by the strap 10 even though the plate 15 be limited in its vertical travel to a definite location, and the number of different sizes of conductors as 13 that could be properly gripped or fitted under these conditions would be determined by the closeness of each other of the holes 14 in the strap 10. The holes 14 must be spaced sufficientlly far apart from each other to allow a sufficient body of metal between the holes to stand the strain of tensioning the strap, and in practice, this distance is great enough to effect the range of the adjustment to such an extent that all of the different pipes and conductors commonly met with in practice could not be properly fitted by means only of any feasible number of holes 14 in the strap 10, thus necessitating an additional and finer adjustment than is obtained by the holes alone. This additional adjustment is provided by means of the vertical travel of the plate 15 from the top to the bottom of the upright 18 and the length of this travel is so proportioned with respect to the distance between adjacent holes 14 in the strap that a slightly greater amount of adjustment is obtained by the full travel of the plate 15 than is obtained by changing plate 15 from one set of holes to an adjacent set of holes and it therefore becomes possible, because of the coaction of the two adjustment features, to tightly fit the strap 10 about the conductor 10 irrespective of its diameter.

In actual practice, the conductor 13 may be a round rod varying in size from 3/8 inches to 1¼ inches in diameter or an iron pipe of any trade size from ½ inch to 6 inches or larger, the outside diameters of these various pipes all being different from the outside diameters of any of the solid rods previously mentioned, or the conductor 13 may be a lead pipe of any size from ½ inch to 4 inches and these pipes may be of any one of three different thicknesses in common use and since the outside diameter varies with the thickness of the lead, this class of conductors presents a very large number of outside diameters substantially all of which are different from the outside diameters of iron pipes or solid rods previously mentioned. All together these three types of conductors alone present more than fifty outside diameters which must be properly fitted and we believe that the design of strap and tightening device in the illustrated embodiment of our invention is the only type of adjustment so far designed which makes it possible to definitely, accurately and tightly clamp the strap 10 about a conductor 13 irrespective of the diameter of the conductor 13.

The strap 10 may be provided with lengthwise slits for the purpose of permitting it to more readily conform to irregularities on the surface of the pipe or other conductor 13 and hence, give a maximum amount of bearing or contact surface on the pipe or conductor 13 and also to provide general pliability thus permitting the strap to be wrapped about conductors of relatively small diameters.

The conductor 13 is usually a water pipe or other conductor the major part of which is buried in the earth and the conduit connecting to the nipple 3 is usually a conduit used as a grounding conductor for an electric conduit system. If a grounding conductor in the form of a wire is also used, the wire is generally installed within the conduit connecting to the nipple 3 and the wire is terminated in the wire terminal 7.

In operation, the section 1 is secured to the pipe 13 independently of section 2 and the section 2 is secured to the grounding pipe or conduit of the conduit system independently of section 1, after which the two sections are brought together and fastened by means of bolt 5 and obviously, owing to the slot 4 and the pivotal movement about the clamping screw 5, the fitting can be adapted to almost any situation within lim-

its requiring an angular and an endwise adjustment.

The strap and the means for tightening it around the pipe and to the body constitutes the subject matter of our application Ser. No. 185,181 filed April 20, 1927 of which application this is a division.

What we claim is:

1. A grounding device of the character described, comprising a body including two rigid sections, one section having means at one end for connection to a conductor, the other section having means for connection to an electric conduit, a clamping member connecting like ends of the sections, and when loosened permitting relative pivotal movement of the sections into different relative angular positions, one of the sections being formed with a slot for receiving the clamping member and permitting relative endwise adjustment of the sections when the clamping member is loosened, the portions of the sections which are clamped together lapping each other, and a wire terminal clamped between the lapping portions for connection to a wire passing through said conduit.

2. A grounding device of the character described, comprising a body including two rigid sections, one section having means at one end for connection to a conductor, the other section having means for connection to an electric conduit, a clamping member connecting like ends of the sections, and when loosened permitting relative pivotal movement of the sections into different relative angular positions, one of the sections being formed with a slot for receiving the clamping member and permitting relative endwise adjustment of the sections when the clamping member is loosened, the portions of the sections which are clamped together lapping each other, and one of the sections being formed with a recess in its face opposed to the other section, and a wire terminal having a portion in said recess.

3. An electric ground connector for connecting two conductors arranged in a fixed relation and comprising a body having two sections, one section having means for rigid engagement with one conductor and the other section having means for rigid connection to the other conductor, the latter being an electric conduit, the sections having lapping portions, and one of the sections being provided with a lengthwise slot permitting endwise and radial adjustment thereof relatively to the other section, a conductor enclosed by said conduit and extending into the section connected to said conduit, said conductor being provided with a terminal and a clamping screw extending through the lapping portions of the sections and through the slot and coacting with said terminal whereby the sections and the conductor are secured together and the terminal held in contact with one of the sections.

In testimony whereof, we have hereunto signed our names respectively at Syracuse, in the county of Onondaga and State of New York, this 4th day of April, 1928, and at Summit, in the county of Union and State of New Jersey, this 30th day of April, 1928.

RAYMOND H. OLLEY.
STEPHEN W. BORDEN.