Dec. 22, 1942. J. M. SHEADEL ET AL 2,306,359

ARCING HORN

Filed Nov. 14, 1941 2 Sheets-Sheet 1

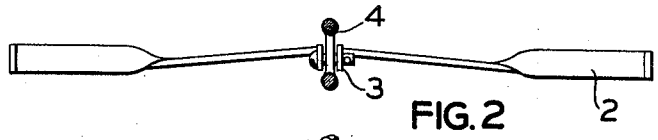


FIG. 2

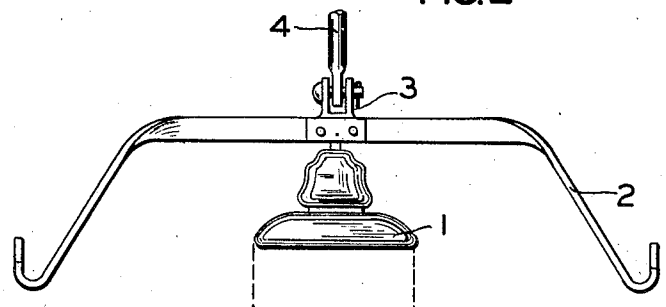


FIG. 1

FIG. 15.

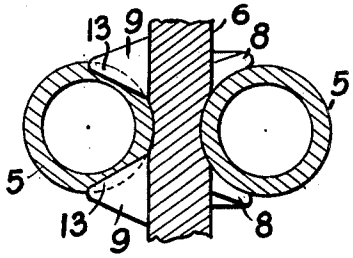
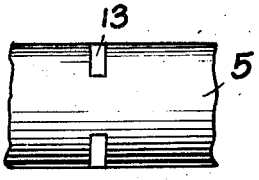


FIG. 16.



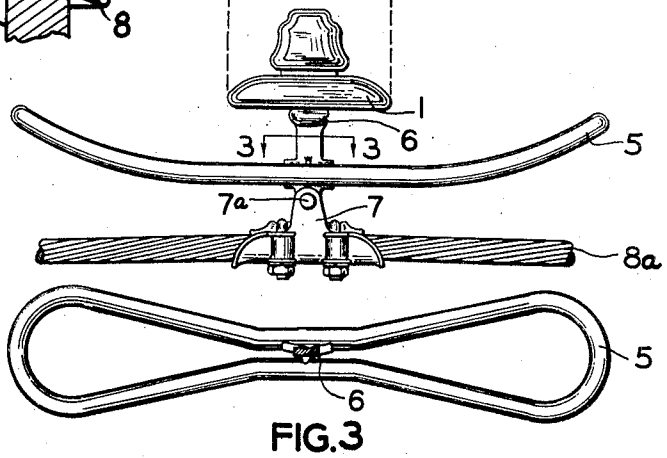


FIG. 3

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ARCING HORN

Filed Nov. 14, 1941 2 Sheets-Sheet 2

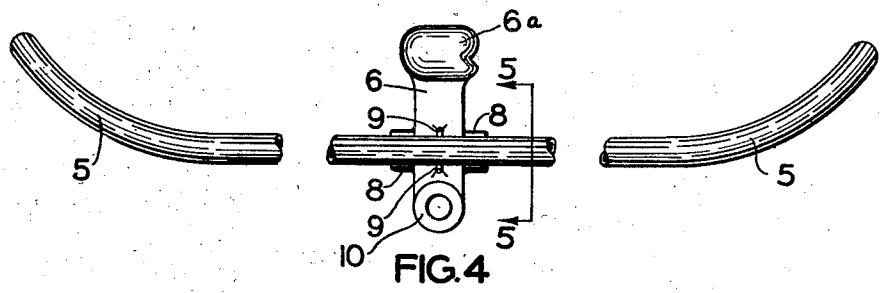


FIG. 4

FIG. 5

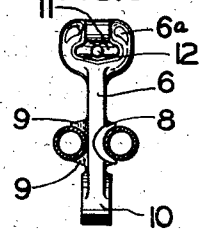


FIG. 6

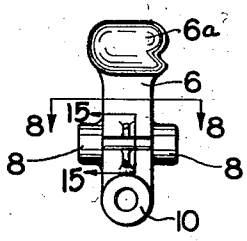
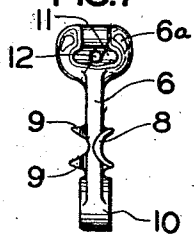


FIG. 7



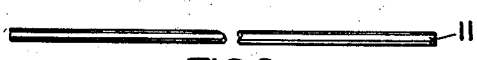


FIG. 9

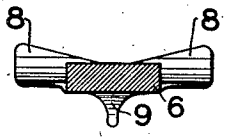


FIG. 8

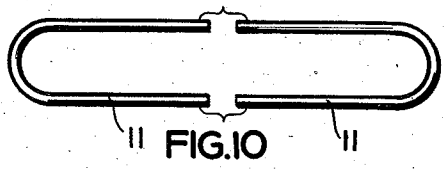


FIG. 10

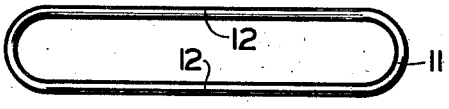


FIG. 11

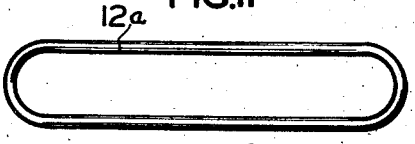


FIG. 12

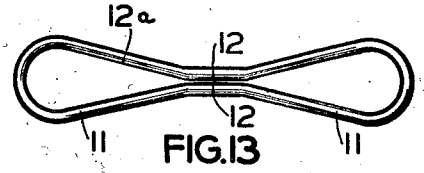


FIG. 13

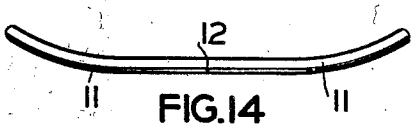


FIG. 14

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UNITED STATES PATENT OFFICE

2,306,359

ARCING HORN

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Application November 14, 1941, Serial No. 419,162

15 Claims. (Cl. 174—144)

This invention relates to arcing horns and in its more specific aspects relates to a method and means of securing an arcing horn to an insulator assembly.

The object of this invention is to construct a fixture for frictionally holding an arcing horn in position on an insulator assembly.

A further object of the invention is to provide a fixture for holding an arcing horn on an insulator assembly that avoids the use of a plurality of bolt or screw clamped devices.

A further object of the invention is to provide a fixture for mounting an arcing horn on an insulator assembly in which the arcing horn is a one-piece bowed pipe assembly.

Another object of the invention is to provide an arcing horn for an insulator assembly in which the horn comprises a one-piece bowed fabricated pipe assembly.

A still further object of the invention is to provide a fixture for assembling an arcing horn onto an insulator assembly in which the horn may be replaced without removing the fixture from the assembly or removing a plurality of bolts or rivets.

Another and further object of the invention is to provide a fixture that can be forged or cast as a single unitary structure.

Another and still further object of the invention is to construct an arcing horn that is formed from one or more standard pipe lengths each of which are bent such as to form the pipe into a closed loop by welding the ends together, the ends of the loop being substantially U shaped.

Other and still further objects of the invention are to simplify the construction of an arcing horn and its fixture for securing same to an insulator assembly, to reduce the cost of assembly and manufacture and to simplify the repair and replacement operation.

Other and further objects of the invention will appear to those skilled in the arts to which this invention pertains as the description proceeds which taken in connection with the accompanying drawings sets forth a preferred embodiment thereof but such disclosure is not to be construed as a limitation of the invention which is limited only by the appended claims and any and all modifications, variations and alterations of structure coming within the spirit and scope thereof are deemed to be included herein.

In the drawings—

Fig. 1 shows an elevational view of an insulator assembly.

Fig. 2 shows a plan view of the upper end of the insulator assembly with parts in section to show detail.

Fig. 3 shows a view of the lower arcing horn taken substantially along the line 3—3 of Fig. 1.

Fig. 4 shows a side elevational view of the lower arcing horn and the fixture for securing same to an insulator assembly.

Fig. 5 is a view taken substantially along the line 5—5 of Fig. 4.

Fig. 6 shows a side elevational view of the fixture.

Fig. 7 shows an end elevational view of the fixture without the arcing horn in position.

Fig. 8 is a view taken along the line 8—8 of Fig. 6.

Figs. 9–14 show the steps of manufacture of the arcing horn in which:

Fig. 9 shows a standard pipe section.

Fig. 10 shows two bent pipe sections before welding.

Fig. 11 shows the two pipe sections after welding.

Fig. 12 shows an alternate step with a single pipe section having two bends therein and only one weld.

Fig. 13 shows the bending of the pipe in one direction, and

Fig. 14 shows the bending of the pipe in the other or transverse direction.

Fig. 15 shows an enlarged section along the line 15—15 of Fig. 6, with horn in position.

Fig. 16 shows an enlarged detail of the pipe section engaging one side of the fixture.

The electrical transmission arts in which strings of insulators are employed call for the use of arcing horns to transfer flash-overs away from the breakable porcelain over onto metallic elements extending transversely from the ends of the insulator and which take up the flash-over at such times as it occurs. There are various expedients well-known in the arts which provide for assembly of the arcing horns onto the string of insulators many of which employ riveted assemblies or a plurality of screws of divers classification which for purposes of disassembly of the arcing horn as well as its assembly involve a rather laborious proceeding. The applicant has, therefore, provided a simple and inexpensive unitary fixture construction to receive one or more of the arcing horns that will allow a ready assembly of the arcing horn onto the fixture that secures the same to an insulator assembly and that avoids the use of a riveted or a screwed construction. The applicant has further provided a new and novel unitary arcing horn construction that in cooperation with the fixture makes possible a substantial and sturdy construction and which takes advantage of the natural resiliency possessed by a rod or tubular assembly of which the arcing horn is constructed to hold same to the fixture.

The carrying out or the embodiment of the above purposes and objects is set forth in the accompanying drawings in which 1, 1 is representative of a string of porcelain insulators to the upper end of which an arcing horn 2 is se-

cured by means of a fixture 3 with which linkage 4 is swingably associated for the purpose of suspending same from a supporting tower or crossarm of such a tower. The arcing horn 2 furthermore is intended to be permanently fixed to the upper end of the insulator assembly and in the event of replacement the entire unit and its fixture 3 is replaced.

The lower end of the assembly has arranged thereon an arcing horn 5 which is of a single, continuous loop, unitary construction, more specifically detailed hereinafter, secured to and frictionally held in a fixture 6 suspended from the pin of the terminal insulator of the insulator assembly. A conductor 6*a* is suspended from the fixture 6 in a hanger 7, of more or less conventional design, pivotally supported to the said fixture 6.

The construction of the fixture 6 is more specifically and clearly detailed in Figs. 4 through 8 in which a head 6*a* is provided having an opening or socket 11 therein to receive the head of an insulator pin which is common to the insulator arts. An opening 12 is formed in the head 6*a* as shown which is adapted to receive a cotter pin to prevent the disassembly of the fixture 6 from the insulator 1, except at the election of an operator.

The arcing horn 5 is of the shape generally indicated in Figs. 3 and 4 which shows the ends thereof bowed upwardly and the mid-section compressed, bent inwardly or converging such that the horizontal or straight portions thereof are parallel and in substantial proximity to each other. The fixture 6 is provided with a longitudinally extended seat portion 8, 8, as more particularly shown in Figs. 6 and 8 and partially circumscribes one of the straight side portions of the arcing horn 5. The opposite side of the fixture has arranged thereon a pair of projections 9, 9 that are spaced apart sufficiently in the vertical direction such that they will receive the other straight side portion of the arcing horn 5 and form the equivalent of the seat to receive that side portion of the pipe. The principal reason for the projections 9, 9 is to make possible a quick assembly of the horn 5 onto the fixture 6 and obviate the necessity of an expansive spreading of the arcing horn to place it in position on the fixture 6. The projections 9, 9 only require that the one portion of the arcing horn be seated firmly in the members 8, 8 and in the opposite portion can be eased into position with a minimum of spreading of the converging sides of the arcing horns. The natural resiliency of the bent portions of the arcing horn 5 will keep the horn firmly in position on the fixture 6 without the use or aid of rivets or screws as in previous constructions well-known to the arts. The horn 5 may be provided with notches or slots 13 adapted to receive the projections 9 if so desired in order to prevent lateral motion of the horn 5 relative to fixture 6. By reverse motion the arcing horn 5 is disassembled from the fixture for replacement or repair as the occasion demands.

The lower end of the fixture 6 is provided with an eye 10 that is adapted to receive the clevis portion of the hanger 7 and a conventional pin 7*a* is then inserted to suspend the hanger 7 from the fixture 6 and the string of insulators 1, 1, as shown.

The arcing horn 5 is fabricated from a standard section of pipe 11, or may be of bar or rod stock, which may be of any well-known commercial construction such as a seamless tube or a welded pipe. The pipe or rod sections 11 are bent into the shape of a U in which the ends have the appropriate spread and are welded together at points 12, 12 to thereby form an endless section of tubing. As an alternate construction the step illustrated in Fig. 12 may be employed in which a single section of pipe, rod or tubing is bent into a double U-form, as outlined in Fig. 11, in which it is only necessary to provide one weld 12*a* as indicated in the Fig. 12. Following the welding of the pipe end or ends to form an endless loop, the mid-portion of the endless tubing is bent inwardly as shown more particularly in Fig. 13 and in Fig. 3, such that the sides of the loop converge and are brought into substantial proximity to each other and having a portion of each of the sides parallel. The reason for bringing them into substantial proximity is that when they are spread apart to receive the fixture 6 the tendency of the sections will be to move toward each other and consequently firmly frictionally grip the seat 8, 8 and seat between the projections 9, 9, as previously described. The weld 12*a* is also shown in Fig. 13 to indicate where it may be placed when the alternate step of Fig. 12 is employed. After the pipe section has been shaped in the manner shown in Fig. 13 it then has the ends thereof bowed upwardly or transversely to the longitudinal axis of the loop as illustrated more particularly in Figs. 4 and 14 such that when ultimately assembled into the insulator suspension assembly the tips of the arcing horn 5 will point upwardly or in the direction of the tips or ends of the horn 2. It should be observed that the welds are preferably placed in any straight section of the pipe and may be placed, e. g., as at 12*a* although the exact location of the weld is immaterial to the instant construction.

From the foregoing it should be apparent that a simplified construction has been provided to receive a unitary arcing horn construction that is fractionally held in position on the insulator assembly. That which is regarded new, novel and useful and which is sought to be protected by Letters Patent of the United States is as follows:

I claim:

1. In an arcing horn supporting device; an arcing horn composed of an endless tube formed into an elongated structure bowed at its ends and having the mid-section portion of said horn disposed in immediate proximity to each other; means to suspend said horn from a string of insulators which comprises an elongated member disposed between said mid-section portions of said horn, said means having channels therein to seat said horn and means to prevent relative vertical displacement of said means; said horn frictionally engaging said means.

2. In an arcing horn device; an arcing horn in which two portions thereof are resiliently held in close proximity to each other; a member disposed between said two portions and frictionally held there, said member having means thereon in which each of said portions seat, said member having means thereon to prevent relative vertical displacement of said member and said horn portions and means on said member to suspend same from an insulator.

3. In an insulator fixture; a tubular horn having two portions in substantial proximity; a fixture disposed between said portions and adapted to secure same to an insulator, said fixture hav-

ing seat portions disposed transversely to the principal axis of said fixture to receive said horn portions; said fixture having other means thereon to prevent displacement of said horn along its principal axis; and said horn portions resiliently engaging said fixture to prevent movement of said horn portions relatively axially of said seat portions.

4. In an arcing horn device; a horn having two portions disposed in proximity to each other; a coupling adapted to be frictionally engaged between said portions, said coupling having means thereon extending from the side thereof in which to seat one of said horn portions, and said coupling having means thereon to prevent relative vertical movement of said other portion and said coupling.

5. In an arcing horn device the combination; an arcing horn comprising an endless tubular section bent into a bow and having two portions of said bow bent to place them in proximity to each other; a coupling disposed between said portions, said coupling having a seat portion to engage one of said horn portions; and means on said coupling engaging the other of said horn portions to prevent same from being displaced relatively vertically to said coupling; and said horn portion frictionally engaging said coupling.

6. In a one-piece arcing horn; a body member having means thereon to mount same on an insulator pin; a one piece arcing horn mounted on said body; means on said body to hold said horn thereon which includes a seat extending transversely of said body to receive one portion of said horn; projections on said body to receive a different portion of said horn; said horn portions frictionally engaging said body and maintained by the resilience of said horn portions.

7. In an arcing horn device; a closed loop horn in which the sides thereof converge toward each other and in which portions of the sides thereof remain straight and parallel to the longitudinal axis of the horn; means to support said horn on an insulator assembly, said means having a seat adapted to receive one of said straight parallel side portions of said horn, and means on said support adapted to receive the other of said straight side portions of said horn; said horn resiliently and firmly engaging said fixture.

8. In an arcing horn device; a bowed closed loop arcing horn, in which the sides converge towards each other and in which a portion of each of said sides are parallel and in substantial proximity; a fixture for mounting same on an insulator assembly, said fixture having means on one side thereof in which to seat one of said portions and means on the opposite side thereof to engage the other portion; said horn resiliently clamping itself to said fixture.

9. In an arcing horn, the combination; a bowed closed loop arcing horn in which the sides converge towards each other and in which portions of the sides are straight and parallel; a fixture for supporting said horn on an insulator assembly which includes, means to seat one of said straight side portions, and spaced projections on said fixture adapted to receive the other of said straight portions, said fixture disposed between said straight portions and frictionally held there by the resilience of said loop.

10. In an arcing horn supporting device; an endless tube arcing horn formed into an elongated structure bowed at its ends and having the midsection portions thereof disposed in immediate proximity to each other; means to suspend said horn from a string of insulators which includes an elongated member arranged between said midsection portions of said horn, said means having a formation thereon to seat said horn to prevent relative vertical displacement of said horn and said means and projections on said means engaging slots in said horn to prevent lateral displacement of said horn relative to said means.

11. In an arcing horn device; a one-piece arcing horn in which two portions thereof are held in close proximity to each other; a member disposed between said two portions; said member having means thereon in which each of said two portions seat, said means being so constructed and arranged that they will prevent vertical and lateral displacement of said arcing horn relative to said member and means on said member to suspend same from an insulator, said portions resiliently engaging said means.

12. In an insulator fixture; a continuous bar-like horn having two portions spaced in substantial proximity to each other; a fixture arranged between said portion and including a head structure to secure said fixture to an insulator, said fixture having a seat portion to receive one of said two portions; means on said fixture engageable in a slot in the other of said two portions, and said horn portion being resiliently urged into engagement with said seat and with said means to thereby prevent relative lateral and vertical movement thereof with respect to said fixture.

13. In an arcing horn device; a horn which has two portions disposed in spaced substantially parallel proximity to each other; a coupling element arranged between said two portions; and means on each side of said coupling in which said two portions are adapted to seat, said means and said horn being constructed and arranged such that said horn will be retained against lateral and vertical displacement relative to said coupling.

14. In an arcing horn device; a bowed closed loop arcing horn, in which the sides converge towards each other and in which a portion of each of said sides are parallel and in substantial proximity; a fixture for mounting same on an insulator assembly, said fixture having means on one side thereof in which to seat one of said portions and means on the opposite side thereof engageable with a slot in the other portion to prevent lateral motion of said horn relative to said fixture; said horn resiliently clamping itself to said fixture.

15. In an arcing horn, the combination; a bowed closed loop arcing horn in which the sides converge towards each other and in which portions of the sides are straight and parallel; a fixture for supporting said horn on an insulator assembly which includes, means to seat one of said straight side portions, and spaced projections on said fixture adapted to be received in a slot in the other of said straight portions to prevent lateral motion of said horn relative to said fixture, said fixture disposed between said straight portions and frictionally held there by the resilience of said loop.

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