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STRAINER AND METHOD OF MAKING SAME

Filed May 5, 1941

2 Sheets-Sheet 1

Oct. 17, 1944.

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This invention is directed to a roof gutter strainer of the type that is adapted to be inserted in a conductor or drain pipe so as to prevent debris in the gutter from entering and clogging the conductor pipe.

It is an object of the invention to provide such a strainer made from a series of wires that are initially straight and are bent simultaneously to form a cage which is substantially hemispherical throughout its upper portion, the lower portion of which is first formed into a cylinder and then into a segment of a cone.

It is not new to provide wire strainers, but in the past these have been formed by bending the wires and then assembling the bent wires. This is a tedious and costly method compared to my new method, since by my method straight wires can be inserted in a center member with a minimum of labor. Heretofore, in the construction of a strainer having eighteen wires, it was necessary to first bend the eighteen wires individually, which required eighteen operations. It was then necessary to set the eighteen wires in place, which required eighteen additional operations and finally, the eighteen wires were secured in place, one at a time, necessitating eighteen further operations. According to my invention, an eighteen wire strainer can be made by using nine straight wires, thus reducing the first number of operations by one-half. The second set of operations and the third set are superseded by a single operation inasmuch as it is only necessary to lay nine wires in place and then, in a single operation, bend the wires downwardly and outwardly, which secures them in place with respect to a center plate and gives the wires their final form. The eighteen wire strainer has been taken as an arbitrary example and it will be apparent, the larger the strainer, the more wires, so that in the manufacture of relatively large strainers, the saving will be proportionately greater. It is, therefore, a specific object of this invention to greatly reduce the number of operations heretofore required to form a wire strainer.

It is another object of this invention to provide various center plates for a roof gutter strainer which are of novel construction.

It is a still further object of the invention to provide a retaining collar for the free ends of the strainer which is of novel construction and which can be easily attached to the free ends of a strainer.

It is a particular object of the invention to provide a strainer which can be assembled at less cost than any strainers prior hereto.

A further object of the invention is to provide a novel method of forming roof strainers from wire.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawings and the following description set forth in detail one method and certain structure embodying the invention, such disclosed method and means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:

Figure 1 is a plan view of the center plate and an individual wire.

Figure 2 is a plan view taken from above of the wires inserted in the center plate.

Figure 3 is a plan view taken from above, of the center plate and wires after placement upon the male die.

Figure 4 is a diagrammatic showing comprising a vertical elevation with parts in section showing the male and female dies just prior to the major bending operation. Figure 5 is also a diagrammatic view and comprises an elevation with parts in section after the major bending operation.

Figure 6 is an elevation of the collar.

Figure 7 is an elevation of the completed strainer.

Figure 8 is a horizontal section taken on line 8-8 of Figure 7, looking downwardly.

Figure 9 is a side elevation of the center plate of Figure 1, (taken from the right hand side).

Figure 10 is a plan view of a modified form of center plate.

Figure 11 is a plan view of another modification of the center plate.

Figure 12 is a side elevational view of the center plate shown in Figure 11 but with the retaining fingers shown in final position.

Referring now to the drawings and more particularly to Figure 1, it will be seen that I have provided a center plate generally indicated at 1, which is rectangular in general outline. This plate is made from a strip of material which is cut in requisite lengths and then provided with openings 2, 3, 4 and 5, the openings being located at each of the corners of the cut-off portion. The plate is also provided with recesses 8 and 10, since this permits bending of the ears 11, 12, 13 and 14 for a reason which will appear as
the description proceeds. Parallel slits 6 and 7 are formed in the plate and the surfaces of the plate between such slits and the recesses 10 and 9 respectively, are depressed so that they lie slightly out of the plane of the portion of the plate between slits 6 and 7. This in effect opens the slit to form an aperture with spaced parallel walls so that wires may be easily inserted therein. Another pair of parallel slits 8 and 9 are formed, these extending at right angles to the first named pair and similarly, the plate is depressed slightly between such slits and the outer edges of the plate which permits ready insertion of a group of wires through slits 6 and 7 and also permits ready insertion of another group of wires through slits 8 and 10 in such manner that the two groups cross each other substantially at the center of the center plate.

Obviously, the wires A and B extending through the slits 6 and 19 are in a plane slightly below the plane of the wires E and F which extend through slits 8 and 10, and it will be seen that substantially straight wires can easily be inserted, the number depending entirely upon the size of the strainer.

Additional wire receiving means are provided in the form of openings 2, 3, 4 and 5, and since the parts 11, 12, 13 and 14 are pressed downwardly, the wires received in the openings extend in planes below the wires received in the slits. The ears 11 and 13 may, if desired, be pressed a little further out of the plane of the center plate than the ears 12 and 14, so that the openings 3 and 4 will receive wires in a plane below the plane in which the wires G and H extend. Thus it will be seen that no difficulty is incurred in assembling the wires in four different planes and since the groups of wires extend in different planes, the assembly of the center plate and wires is achieved simply and expeditiously.

It is to be understood that the wires A and B or any other pair of wires will not extend exactly as shown in Figure 2 and will, in all probability, be bent and ends so that they can be easily grasped and pushed apart. It is also to be understood that a group of wires may consist of a single wire or any desired number since the number of wires depends upon the size of the strainer and the length of the slits as well as the size of the openings in the center plate.

The method of manufacturing the strainer is shown progressively in Figures 1 to 7 inclusive. Wires A and B are inserted through slits 6 and 19. Then wires E and F are inserted through slits 6 and 7. After this, the diagonal wires C and D are inserted through openings 2 and 4 and finally diagonal wires G and H are inserted through openings 3 and 5. The precise sequence of insertion is immaterial and in any event, the assembly of center plate and wires is easily formed due to the fact that the wires are substantially straight and the pairs of openings, whether they be slits or circular apertures, are located in slightly differing planes. The assembly of the center plate is then placed upon a male die 24, shown in Figure 3, and the wires are pulled apart so as to go over each of the upward projections or lands 36, 37, 38, 39, 40, 41, 42 and 43.

It will be noted that each of the lands is provided with a centering and spacing of the wires in a predetermined desired arrangement. The female die 20, mount-
formed in exactly the same manner as set forth with respect to center plate 1.

Referring now to the further modification shown in Figures 11 and 12, this will be seen to comprise what may be termed a bottom plate 61 and another upper plate 62. The bottom plate is provided with a number of center plates may be desired, the particular modification shown, embodying four ears 62, 63, 64 and 65. Straight wires are placed so as to extend radially from the center of the bottom plate 61 and so as to lie upon the upper surface 63 of the bottom plate 61. The top plate 67 is then placed over the wires and the ears are bent upwardly and over as shown in Figure 12, to retain the wires in their radially aligned positions. After this is done, the composite unit is placed in the press shown in Figure 4, which upon actuation imparts the general configuration shown in Figure 7. It is to be particularly noted that the upper plate 66 has a concave downwardly directed portion to accommodate the wires where they cross at the center of the plate.

The strainer with any preferred form of center plate will readily fit it in the conductor pipe and will effectively bar debris, which ordinarily collects in the gutter, from entering the conductor pipe.

From the foregoing description, it will be seen that I have provided a wire strainer which is easily assembled and easily bent into shape due to the fact that it is only necessary to employ a center plate and straight wires. The provision of parallel slits of differing elevations, permits ready insertion of the straight wires in the center plate and also anchors the wires at a common center so that the same may be readily bent into a cage type of strainer. It will also be noted that I have provided a unique form of center plate which is inexpensively formed and which can be used with various sizes of strainers. Lastly it will be noted that I have provided a novel collar that can be easily assembled with the wires and which will maintain the wires in accurately spaced relationship. The collar, being a U-shaped member and having legs of different diameters, forces the free ends of the strainer radially inward or toward each other so that assembly of the collar with the wires of the strainer eliminates one bending operation and yet insures permanent spacing of the wires of the strainer.

Referring now to the object set forth at the beginning of this specification to wit, reducing the number of operations in the manufacture of a wire strainer, it will be observed that the total number of operations required to form an eighteen wire strainer is fifty-four. In sharp contrast to this, I can form an eighteen wire strainer in ten operations since it is only necessary to associate nine wires with the center plate and then bend in a single operation. In fact, I can make a number of strainers according to my invention while one strainer is being made according to present practice.

It is to be understood that I do not desire to be restricted to any particular type of center plate since I have shown three different forms and others will be apparent, once the broad principles of my invention are understood. Various types of center plates readily accommodate straight wires and will retain the straight wires in a precise radial relationship after the wires are bent into their final form. This eliminates the heretofore costly operation of first bending the wires and then securing the wires to some central member. It is believed to be obviously, far less difficult to merely lay straight wires upon a central receiving member and then bend the wires in a simple, single operation.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the means and the steps herein disclosed, provided those stated by any of the following claims or their equivalent be employed. I therefore particularly point out and distinctly claim as my invention:

1. An article of the character described comprising a center plate, a series of wires and a collar, each of said wires extending into said center plate and out of said center plate, said series of wires being divided into groups, one of said groups extending through said plate at one elevation, and another group extending through said center plate at different elevation.

2. A center plate, for a roof gutter strainer, comprising a metallic member having two pairs of slits and four openings, one pair of said slits extending at right angles to the other pair, and each of said openings being located at a corner of said member.

3. A center plate, for a roof gutter strainer, comprising a metallic member having two pairs of slits and four openings, one pair of said slits extending at right angles to the other pair, and each of said openings being located at a corner of said member.

4. A method of forming a roof gutter strainer, which comprises providing a center plate, slitting said plate, forming openings in said plate, inserting groups of wires in said slits and in said openings with one group crossing another group at a common point, bending the wires of each group slightly apart, then bending all of said wires downwardly and into planes radiating from said common point.

5. A method of forming a roof gutter strainer, which comprises providing a center plate, slitting said plate, forming openings in said plate, inserting groups of wires in said slits and in said openings with one group crossing another group at a common point, bending the wires of each group slightly apart, then bending all of said wires downwardly and into planes radiating from said common point thus causing each wire to assume a substantially U-shape and finally securing said wires in spaced relationship with the ends thereof drawn radially inwardly.

6. A strainer adapted to be inserted in a conductor pipe to prevent debris in gutter attached to said pipe from entering said pipe, said strainer comprising a series of wires bent into the form of hemisphere in spaced relation and being constructed to a diameter smaller than that of said hemisphere.

7. A method of forming a roof gutter strainer, which comprises assembling a multiplicity of wires in a flat plane with each of said wires secured at its mid-point, then bending said wires into a cage having a hemispherical upper portion and a cylindrical lower portion, then contracting said cylindrical portion of the covering wires of said cage in radially spaced planes.

8. A center plate for a roof gutter strainer made of wires comprising means to receive substantially straight wires extending in one direction,
means to receive substantially straight wires extending in another direction and means to receive other wires extending angularly with respect to said first and second named wires.

9. A center plate for a roof gutter strainer made of wires comprising means to receive substantially straight wires extending in one direction, means to receive substantially straight wires extending in another direction and means to receive other wires extending angularly with respect to said first and second named wires, said first and second named means comprising grooves in said plate and said last named means comprising apertures in said plate.

10. A center plate for a roof gutter strainer made of wires, comprising means to receive substantially straight wires extending in one direction, means to receive substantially straight wires extending in another direction and means to receive other wires extending angularly with respect to said first and second named wires, said center plate having a lower part and an upper part, one of said parts being concave, thus permitting all of said wires to cross at a common point.

11. An article of the character described comprising a roof gutter strainer, having a center plate, a series of wires and a collar, each of said wires extending into said center plate adjacent one edge thereof and out of said center plate adjacent an opposite edge, and being free to form the strainer structure, each of said wires having a generally U shape and extending upwardly then through the center plate and then downwardly with the free ends of said wires held by said collar.

12. An article of the character described comprising a roof gutter strainer, having a center plate, a series of wires and a collar, each of said wires extending into said center plate adjacent one edge thereof and out of said center plate adjacent an opposite edge, all of said wires extending substantially radially from the center of said center plate, and being free to form the strainer structure, each of said wires having a generally U shape and extending upwardly then through the center plate and then downwardly with the free ends of said wires held by said collar.

13. An article of the character described comprising a roof gutter strainer, having a center plate, a series of wires and a collar, each of said wires extending into said center plate adjacent one edge thereof and out of said center plate adjacent an opposite edge, all of said wires extending substantially radially from the center of said center plate and being held in radial alinement by said collar, said collar being located in a plane below that of said center plate, and being free to form the strainer structure, each of said wires having a generally U shape and extending upwardly then through the center plate and then downwardly with the free ends of said wires held by said collar.

14. An article of the character described comprising a roof gutter strainer, having a center plate, a series of wires and a collar, each of said wires extending into said center plate adjacent one edge thereof and out of said center plate adjacent an opposite edge, said center plate being provided with a multiplicity of oppositely disposed openings to receive said wires, and being free to form the strainer structure, each of said wires having a generally U shape and extending upwardly then through the center plate and then downwardly with the free ends of said wires held by said collar.

15. An article of the character described comprising a roof gutter strainer, having a two part center plate, a series of wires and a collar, each of said wires extending into said center plate from one edge thereof and between such two parts and out of said center plate from an opposite edge, said center plate having means associated therewith to retain said wires between such two parts each of said wires crossing all of the remaining wires in said series, the free ends of said wires being held by said collar.

16. A method of forming a roof gutter strainer, which comprises the steps of inserting a multiplicity of pairs of substantially straight wires entirely through a center plate, so that said wires extend in a flat plane, then separating the free ends of said wires, then bending all of said wires in a single operation, out of said flat plane and into the form of an open ended cylinder having a rounded end and finally securing said wires with the free ends in spaced relation.

17. A method of forming a roof gutter strainer, which comprises the steps of; forming a center plate with intersecting wire receiving grooves and aligned apertures, having axes that intersect with the intersection of said grooves at a common point, assembling a multiplicity of wires with said center plate, by placing some of said wires in said grooves and inserting some of said wires in said apertures so that all of said wires extend in a substantially flat plane and in such manner that said wires cross at a common point, then bending all of said wires downwardly and into planes radiating from said common point, in a single operation, out of said flat plane and into the form of an open ended cylinder having a rounded end and finally securing said wires in such bent condition.

18. A method of forming a roof gutter strainer, which comprises assembling a multiplicity of wires in a flat plane in groups, securing each of said wires at its mid-point, arranging the free ends of said wires equidistantly, then bending all of said wires in a single operation into a cage having a hemispherical upper portion and a cylindrical lower portion.

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