APPLICATION FOR PATENT

Title: Wire Wrap Screen Manufacturing Method

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FIELD OF THE INVENTION

[0001] The field of the invention is manufacturing techniques for making wire wrap screen.

BACKGROUND OF THE INVENTION

[0002] Wire wrap screens are made by putting a series of longitudinal ribs in a circular arrangement an having each rib extend radially beyond a hub that places all the ribs in a cylindrical arrangement. A wrap wire is passed between the a weld roller and the ribs in succession as the hub rotates on its axis and the ribs are drawn along axes parallel to the axis of rotation of the hub. The weld roller is adjusted for the amount of force it places on the wrap wire. Current is applied as the wrap wire encounters a rib to effect a resistance weld.

[0003] The problem with this technique is that the wrap wire can neck down or get thinner as a result of uneven force applied to the wire from the weld roller. Additionally, if the wire is bent as it contacts a rib such bending also contributed to necking down when resistance welding the wrap wire to the ribs.

[0004] The present invention addresses this issue by straddling ribs with non-conductive and preferably ceramic supports so that the ribs extend radially only a fixed distance beyond the supports. This limits the penetration of the wire under pressure from the roller regardless of the roller force setting. As a result the penetration is uniform when the welding takes place. As an option, the wire can be pre-rolled to approximately the end diameter of the screen being made before there is rib contact as a way of reducing bending at the rib contact for the wire. This can be done with a set of opposed rollers through which the wire is fed before it contacts a rib mounted to the screen head. USP 3,875,977 is relevant to pre-rolling wrap wire.

[0005] These and other aspects of the present invention will become more readily apparent from the detailed description of the preferred embodiment and the associated drawings while recognizing that the full scope of the invention is given by the claims.

SUMMARY OF THE INVENTION

[0006] Non conductive supports flank the mounting location of ribs for a wire wrap screen so as to limit penetration into the wire being fed over the ribs and resistance welded notwithstanding variations of applied force from the weld roller. Optionally the wire can be pre-rolled to approximately its end diameter in the finished screen ahead of the time it contacts a rib so as to minimize bending the wire over the rib which thins the wire. The supports are preferably ceramic and provide equal penetration of the rib into the wrap wire despite variations in loading by the weld roller.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. 1 is a section view of the screen head showing the placement of the wire wrap supports;

[0008] FIG. 2 is the view of FIG. 1 adding the weld roller and the wrap wire being fed;

[0009] FIG. 3 is the view along lines 3-3 of FIG. 2;

[0010] FIG. 4 is an enlarged view of the interface among the weld roller, the screen head and the wrap wire as welding occurs;

[0011] FIG. 5 shows a collection of rollers to pre-bend the wrap wire to an arc with the approximate radius of the screen head;

[0012] FIG. 6 shows the uniform gaps made from spiral winding the wrap wire when it is pre-bent.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0013] The screen head **10** has a plurality of notches **12** along its edge where ribs **14** are inserted. The screen head is a drum that is rotated about its center **16** while

maintaining the relative positions of the ribs **14** in the notches **12**. The ribs **14** are pulled in tandem relative to their notches **12** in the direction of arrow **18** as the screen head **10** is driven on its axis **16** and wrap wire **20** is fed between the screen head **10** and the weld roller **22**. Arrow **24** represents an adjustment of normal force that is applied against the wrap wire **20** by roller **22**. FIG. 4 shows that the pointed ends **26** of each of the ribs **14** penetrate into wrap wire **20** as a result of application of force **24** from the weld roller **22**.

[0014] In operation, electric current is supplied through the weld roller **22** which results in fusing the wrap wire **20** that comes in contact with a rib **14**. In the past there was an issue of uneven penetration of the ends **26** into the wrap wire **20** caused by fluctuation of pressure during operations as depicted by arrow **24**. The roller **22** used to force the wrap wire **14** right onto the rib ends **26** with no backstop. As a result if the force represented by arrow **24** varied during operations the penetration of ends **26** of ribs **14** would also vary.

[0015] To address this issue, the outer surface **28** of the screen head **10** has been fitted with non-conductive segments **30** that preferably straddle each rib **14**. Now the variability of force **24** is irrelevant as the amount of penetration of rib ends **26** is structurally limited by the presence of the preferably ceramic segments that act as a travel stop. In the arrangement of FIG. 4, the penetration of rib ends **26** into the wrap wire **20** is uniform and as long as a minimum pressure exists represented by arrow **24** the ends **26** have the same penetration with each encounter with a rib **14**.

[0016] While the screen head **10** rotates about axis **16** and the ribs **14** are advanced with respect to their notches **12**, the weld roller **22** feeds wrap wire **20** to form a cylindrical shape with spiral wound wrap wire **20** with a resistance weld at each intersection of the wrap wire **20** with a rib **14**.

[0017] The wrap wire **20** can be fed by the weld roller tangentially as shown in FIG. 2. However, one issue of doing so is necking down as the wire wrap **20** is forced to make a bend over the rib **14** as the screen head **10** continues to rotate. One way to minimize this necking down of the wrap wire **20** width which can cause variation in the opening size of the finished screen is to pre-roll the wrap wire **20** using rollers **32** and **34**

on an opposed side of wrap wire **20** from roller **36** so as to create an arc in the wrap wire with an approximate radius of the outer surface of the screen head **10** or segments **30** on the screen head **10**, represented by arrow **38** in FIG. 5. The gaps between windings **40** are uniform as shown in FIG. 6.

[0018] The above description is illustrative of the preferred embodiment and many modifications may be made by those skilled in the art without departing from the invention whose scope is to be determined from the literal and equivalent scope of the claims below:

We claim:

1. A method of manufacturing a screen, comprising:

arranging a plurality of ribs in a predetermined array on a support;

flanking said ribs with segments so as to allow a predetermined extension of rib ends beyond said segments;

feeding a wrap wire over said ribs;

joining said wrap wire to said ribs.

2. The method of claim **1**, comprising:

using said segments to limit rib penetration into said wrap wire when said wrap wire is pushed against said ribs.

3. The method of claim **2**, comprising:

removably mounting said segments to said support.

4. The method of claim **3**, comprising:

making said segments non-conductive.

5. The method of claim **4**, comprising:

making said segments from a ceramic material.

6. The method of claim **2**, comprising:

making said penetrations by said ribs into said wrap wires uniform.

7. The method of claim **6**, comprising:

making said penetrations by said ribs into said wrap wires uniform despite variation of pressure that forces them together above a threshold value.

8. The method of claim **7**, comprising:

providing a circular support for said ribs;

bending said wrap wire into an arc before it contacts a rib on said support.

9. The method of claim **8**, comprising:

making said arc have a radius substantially equal to a radius of said support.

10. The method of claim **8**, comprising:

making said arc have a radius substantially equal to a radius of said segments.

11. The method of claim **10**, comprising:

joining said wrap wire to said ribs with resistance welding.

12. The method of claim **11**, comprising:

using a weld roller to feed wrap wire and press it against said ribs for said resistance welding while moving said ribs in a direction perpendicular to the feed direction of said wrap wire.

13. A wire wrap screen, comprising:

a series of ribs held together by a wrap wire;

said ribs penetrate uniformly into said wrap wire.

14. The screen of claim **13**, wherein:

said wrap wire is spirally wound on said ribs with uniform gaps.

15. The screen of claim **13**, wherein:

said ribs are initially spaced in a circular pattern by a support coupled with flanking said ribs by segments on said support that limit rib end extension so as to limit penetration of wrap wire pressed against said ribs and said segments while being joined to said ribs.

16. The screen of claim **15**, wherein:

said segments are non-conductive of electrical current and removably mounted to said support.

17. The screen of claim **16**, wherein:

said segments are made of a ceramic material.

18. The screen of claim **17**, wherein:

said wrap wire is pre-bent to approximately a radius formed by said segments before making contact with any rib.

19. The screen of claim **18**, wherein:

said wrap wire is joined to said ribs by resistance welding.