

SPECIFICATION

Wire articles and method of forming same

5 This invention relates to wire articles and to a method of forming wire articles.

Many different wire articles are used in homes, gardens, offices, shops, etc., including record and cassette racks, dish racks, vegetable racks, wine racks, bird cages, tool racks, wire trays, wire display stands, clothes driers and airers, and the like. Such wire articles are sold as manufactured products and are generally formed by cutting, bending and welding or soldering metal wire to form a required article. The wire article so formed is then generally provided with a required surface finish, e.g., is dip- or otherwise coated with synthetic plastics material or spray- or otherwise coated with metallic or other paint. Such manufactured wire articles suffer from the disadvantages that they are not adaptable to individual requirements and are relatively expensive to buy.

25 The present invention has as its object to provide a method of forming wire articles which will enable articles to be formed according to individual requirements.

The present invention provides a method of forming a wire article which comprises cutting wire stock into lengths of predetermined size, obtaining a plurality of connector members each comprising at least two socket portions each of which is adapted to receive an end portion of a cut length of wire with a clearance of from 0.05 to 0.254mm, connecting the cut lengths of wire together by means of the connector members to form a required article, and adhesively securing the end portions of the cut lengths of wire in the socket portions of the connector members when connecting the cut lengths of wire together.

The present invention also provides a wire article comprising a plurality of cut lengths of wire of predetermined size and connector members connecting the cut lengths of wire together to form the article, the connector members each comprising at least two socket portions each of which receives an end portion of a cut length of wire with a clearance of from 0.05 to 0.254mm, the end portions of the cut lengths of wire being adhesively secured in the socket portions of the connector members.

55 The wire used in the method and article of the present invention is preferably metal wire which is circular in section and has a diameter of not more than 6.0mm, preferably from 1.6mm to 3.00mm. Preferably the wire has been pre-finished, i.e., has been provided with a suitable surface finish, e.g., has been coated with a suitable synthetic plastics material or with a suitable paint or other surface coating material such as a metallic paint or lacquer.

65 It has been found necessary in order to

satisfactorily adhesively secure the end portions of the wire in the said socket portions to provide a clearance fit of the end portions of the wire in the socket portions. It has also been found that the size of this clearance is critical. If the clearance is too small or if the end portions of the wire are a tight fit in the socket portions then air becomes trapped in the socket portions and the end portions of the wire cannot be inserted fully into the socket portions. On the other hand if the clearance is too large then the strength of the adhesive bond will be impaired. Thus it has been found that the clearance should not be less than 0.05mm. and should not be greater than 0.254mm. and that the clearance is preferably from 0.10mm to 0.178mm.

The said connector members may be of various different kinds for connecting the cut lengths of wire together in various different ways. For example, one kind of connector member may comprise two socket portions which are axially aligned for connecting two cut lengths of wire end-to-end in axial alignment. Such one kind of connector member may, for example, be in the form of a hollow tube into opposite ends of which can be inserted the end portions of two cut lengths of wire to be connected together.

95 Other kinds of connector member may comprise two or more socket portions both or at least two of which have their axes angled with respect to one another, e.g., may comprise a right-angle connector member for connecting two cut lengths of wire at right-angles to one another, a Tee-shaped connector member for connecting three cut lengths of wire together in a Tee-formation, a Y-shaped connector member for connecting three cut lengths of wire together in a Y-formation, or an X-shaped connector member for connecting four cut lengths of wire together in an X-formation.

The said connector members are preferably formed, e.g., moulded, from synthetic plastics material, although they could, if desired be formed from metal, wood or other suitable material.

The article of the present invention may also include one or more feet for supporting the article. The or each such foot may comprise a socket portion adapted to receive an end portion of a said cut length of wire and may, for example, be in the form of a solid sphere of plastics or other suitable material having an aperture therein which forms the socket portion.

Some wire articles, such as a record rack or a toast rack, may require the use of a base member, e.g., a base board, and the method of the present invention may comprise providing a base member, e.g., of polished wood or suitable plastics material, having apertures therein adapted to receive end portions of the cut lengths of wire and inserting the end portions of the cut lengths of wire in said

apertures.

The article of the present invention may further comprise fixtures or fittings necessary for a particular article or articles, e.g., may

- 5 comprise one or more shelves and shelf supports, one or more wall brackets whereby the article can be mounted on a wall, one or more trays or other containers, and/or one or more hook members. Fixtures and fittings such as
- 10 shelf supports, wall brackets or hook members may comprise a sleeve portion through which a cut length of wire has been inserted and which can, if required, be secured at a required position on the cut length of wire by
- 15 means of a suitable adhesive.

The invention will be more particularly described with reference to the accompanying diagrammatic drawings, in which:—

- 20 *Figure 1* shows cut lengths of wire for use in the method of the present invention,

Figures 2A to 2K show various kinds of connector members which may be used in the method according to the present invention,

- 25 *Figures 3A to 3C* show different kinds of feet which may form part of an article according to the present invention,

Figures 4A to 4E show different fixtures and fittings which may form part of an article according to the invention, and

- 30 *Figures 5A to 5D* show examples of articles which can be formed according to the present invention.

The materials used in the method according to the present invention comprises a supply of

- 35 wire which may be in the form of a continuous length, e.g., a coil or skein, suitable for cutting into lengths of predetermined size or may be in the form of cut lengths 1a, 1b, 1c, etc., of predetermined size as illustrated in
- 40 *Fig. 1* and a plurality of connector members which may be of various different types for connecting the cut lengths of wire together in various different ways in order to enable one or more required articles to be formed.

- 45 Various different types of connector member are illustrated in *Figs. 2A to 2K*. Thus *Fig. 2A* shows a connector member 2 in the form of a hollow tube the opposite ends of which are adapted to receive end portions of two cut

- 50 lengths of wire so as to connect the two cut lengths of wire in end-to-end axial alignment. *Fig. 2B* shows a connector member 3 having two hollow tubular limbs 3a, 3b at right-angles to one another for connecting two cut

- 55 lengths of wire at right-angles to one another. *Fig. 2C* shows a Tee-shaped connector member 4 for connecting three cut lengths of wire in a Tee-formation whilst *Fig. 2D* shows a connector member 5 having four limbs at

- 60 right-angles to one another for connecting four cut lengths of wire in a substantially X-formation. *Fig. 2E* shows a connector member 6 having six limbs at right-angles to one another for connecting six cut lengths of wire
- 65 at right-angles to one another. *Fig. 2F* shows

a Y-shaped connector member 7 for connecting three lengths of wire in a Y-formation, *Fig. 2G* shows a four-way angled connector 8, *Fig. 2H* shows a three-way angled corner connec-

- 70 tor 9, *Fig. 2I* shows a five-way connector member 10 and *Fig. 2J* shows a connector block 11 having apertures 11a therein for receiving end portions of the cut lengths of wire and which may be used to connect the

- 75 cut lengths of wire in various different ways. *Fig. 2K* shows a connector member 12 formed from flexible tubing for connecting two lengths of cut wire together so that they can be hinged or flexed relative to one

- 80 another.
- The article of the present invention may comprise one or more feet which may be in the form of a solid sphere having an aperture therein adapted to receive an end portion of a

- 85 cut length of wire or which may be as illustrated in *Figs. 3A to 3C*. The foot 13 illustrated in *Fig. 3A* is in the form of a bead of plastics, wood or other suitable material having an aperture 13a therein for receiving an
- 90 end portion of a cut length of wire. The foot 13, or a foot formed as a solid sphere as above described, may serve both as a foot for supporting an article or as an end cap for capping a free end portion of a cut length of
- 95 wire used in forming an article. The feet 14 illustrated in *Figs. 3B and 3C* are identical except for size and each comprise a disc-like base portion 14a and a socket portion 14b for receiving an end portion of a cut length of
- 100 wire.

Fig. 4A shows a shelf 15 whilst *Fig. 4B* shows a shelf support 16 for supporting the shelf 15.

- The shelf support 16 comprises a channel
- 105 portion 16a adapted to engage over a marginal portion of the shelf 15 and a sleeve portion 16b through which a cut length of wire can be inserted. *Fig. 4C* shows a wall bracket 17 comprising a tab portion 17a
- 110 having an aperture 17b therein through which a screw can be inserted to secure the bracket to a wall and a sleeve portion 17c through which a cut length of wire can be inserted.
- Fig. 4D* shows a corner brace 18 comprising a
- 115 web portion 18a and sleeve portions 18b at either end of the web portion 18a, each of the sleeve portions 18b being adapted to have a cut length of wire inserted therethrough. *Fig. 4E* shows a hook member 19 comprising a
- 120 hook portion 19a and a sleeve portion 19b through which a cut length of wire can be inserted. Each of the fittings shown in *Figs. 4B to 4E* can be secured in a required position on a cut length of wire which has been
- 125 inserted through the sleeve portion thereof as by means of a suitable adhesive.

- It will be understood that the fixtures and fittings illustrated in *Figs. 4A to 4E* are by way of example only and that such other
- 130 fixtures or fittings as may be desired or neces-

sary may be included.

Figs. 5A to 5D show examples of articles made according to the method of the present invention. In these figures the cut lengths or wire, no matter what their length, are indicated by the reference numeral 1 whilst the connector members and fixtures and fittings have been given the same reference numerals as in Figs. 2 to 4. Fig. 5A illustrates a cassette rack, Fig. 5B a desk tidy, Fig. 5C a wine rack and Fig. 5D a tool rack. All of these articles use parts as previously described with the exception of the desk tidy of Fig. 5B wherein in addition to parts as previously described there is used two plastics containers 20.

The wire 1 used in the method and article of the present invention as described in conjunction with the drawings is pre-finished, i.e., is provided with a suitable surface finish. Thus the wire 1 may be coated with a suitable plastics material or with a suitable paint or other surface coating material, e.g., a metallic paint, or may be anodised or otherwise surface finished. The wire may be of any suitable metal material and is preferably sufficiently ductile as to enable it to be bent to and remain in a required shape whilst being sufficiently stiff as to be self-supporting and resistant to ready deformation when formed into an article. The wire may be of any suitable thickness and of any suitable cross-sectional shape but is preferably circular section wire having a diameter of not more than 6mm. (1/4 inch) and preferably a diameter of 3mm. (one-eighth inch) or 1.6mm. (one-sixteenth inch). The article may, if desired, comprise wire of two or more different cross-sectional configurations and/or two or more different thicknesses, the connector members being suitably modified to accommodate cut lengths of wire of the different cross-sectional configurations and/or thicknesses.

The method of the present invention includes the step of adhesively securing the end portions of the wire in the connector members and the articles shown in Figs. 5A to 5D are so adhesively secured. To provide an adequate adhesive bond of the end portions of the wire in the connector members the end portions of the wire fit in the connector members with a clearance of from 0.05mm. to 0.254mm. and preferably a clearance of from 0.10mm. to 0.178mm.

CLAIMS

1. A method of forming a wire article which comprises cutting wire stock into lengths of predetermined size, obtaining a plurality of connector members each comprising at least two socket portions each of which is adapted to receive an end portion of a cut length of wire with a clearance of from 0.05 to 0.254mm, connecting the cut lengths of wire together by means of the connector

members to form a required article, and adhesively securing the end portions of the cut lengths of wire in the socket portions of the connector members when connecting the cut lengths of wire together.

2. A method according to claim 1, wherein said clearance is from 0.10 to 0.178mm.

3. A method according to claim 1 or 2, wherein the wire stock is circular in section and has a diameter of not more than 6mm.

4. A method according to claim 3, wherein the wire stock has a diameter of from 1.6mm. to 3.0mm.

5. A method according to any of the preceding claims which comprises bending at least one of said cut lengths of wire prior to connecting the cut lengths of wire together.

6. A method according to any one of the preceding claims wherein the wire stock has been provided with a surface finish.

7. A method according to claim 6, wherein the wire stock has been coated with a synthetic plastics material.

8. A method according to claim 6, wherein the wire stock has been coated with a metallic paint or lacquer.

9. A method according to any one of the preceding claims wherein said connector members are moulded from synthetic plastics material.

10. A method according to any one of the preceding claims, wherein at least one said connector member comprises two socket portions which are axially aligned for connecting two cut lengths of wire end-to-end in axial alignment.

11. A method according to claim 10, wherein said at least one connector member is in the form of a hollow tube.

12. A method according to any one of the preceding claims, wherein at least one said connector member comprises at least two socket portions the axes of which are angled with respect to one another.

13. A method according to any one of the preceding claims, which comprises providing a base member having apertures therein adapted to receive end portions of the cut lengths of wire and inserting the end portions of at least some of the cut lengths of wire in said apertures.

14. A method according to claim 13, which comprises adhesively securing the end portions of the cut lengths of wire in said apertures in said base member.

15. A wire article comprising a plurality of cut lengths of wire of predetermined size and connector members connecting the cut lengths of wire together to form the article, the connector members each comprising at least two socket portions each of which receives an end portion of a cut length of wire with a clearance of from 0.05 to 0.254mm, the end portions of the cut lengths of wire



sary may be included.

Figs. 5A to 5D show examples of articles made according to the method of the present invention. In these figures the cut lengths or wire, no matter what their length, are indicated by the reference numeral 1 whilst the connector members and fixtures and fittings have been given the same reference numerals as in Figs. 2 to 4. Fig. 5A illustrates a cassette rack, Fig. 5B a desk tidy, Fig. 5C a wine rack and Fig. 5D a tool rack. All of these articles use parts as previously described with the exception of the desk tidy of Fig. 5B wherein in addition to parts as previously described there is used two plastics containers

The wire 1 used in the method and article of the present invention as described in conjunction with the drawings is pre-finished, i.e., is provided with a suitable surface finish. Thus the wire 1 may be coated with a suitable plastics material or with a suitable paint or other surface coating material, e.g., a metallic paint, or may be anodised or otherwise surface finished. The wire may be of any suitable metal material and is preferably sufficiently ductile as to enable it to be bent to and remain in a required shape whilst being sufficiently stiff as to be self-supporting and resistant to ready deformation when formed into an article. The wire may be of any suitable thickness and of any suitable cross-sectional shape but is preferably circular section wire having a diameter of not more than 6mm. (1/4 inch) and preferably a diameter of 3mm. (one-eighth inch) or 1.6mm. (one-sixteenth inch). The article may, if desired, comprise wire of two or more different cross-sectional configurations and/or two or more different thicknesses, the connector members being suitably modified to accommodate cut lengths of wire of the different cross-sectional configurations and/or thicknesses.

The method of the present invention includes the step of adhesively securing the end portions of the wire in the connector members and the articles shown in Figs. 5A to 5D are so adhesively secured. To provide an adequate adhesive bond of the end portions of the wire in the connector members the end portions of the wire fit in the connector members with a clearance of from 0.05mm. to 0.254mm. and preferably a clearance of from 0.10mm. to 0.178mm.

CLAIMS

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members to form a required article, and adhesively securing the end portions of the cut lengths of wire in the socket portions of the connector members when connecting the cut lengths of wire together.

2. A method according to claim 1, wherein said clearance is from 0.10 to 0.178mm.

3. A method according to claim 1 or 2, wherein the wire stock is circular in section and has a diameter of not more than 6mm.

4. A method according to claim 3, wherein the wire stock has a diameter of from 1.6mm. to 3.0mm.

5. A method according to any of the preceding claims which comprises bending at least one of said cut lengths of wire prior to connecting the cut lengths of wire together.

6. A method according to any one of the preceding claims wherein the wire stock has been provided with a surface finish.

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9. A method according to any one of the preceding claims wherein said connector members are moulded from synthetic plastics material.

10. A method according to any one of the preceding claims, wherein at least one said connector member comprises two socket portions which are axially aligned for connecting two cut lengths of wire end-to-end in axial alignment.

11. A method according to claim 10, wherein said at least one connector member is in the form of a hollow tube.

12. A method according to any one of the preceding claims, wherein at least one said connector member comprises at least two socket portions the axes of which are angled with respect to one another.

13. A method according to any one of the preceding claims, which comprises providing a base member having apertures therein adapted to receive end portions of the cut lengths of wire and inserting the end portions of at least some of the cut lengths of wire in said apertures.

14. A method according to claim 13, which comprises adhesively securing the end portions of the cut lengths of wire in said apertures in said base member.

15. A wire article comprising a plurality of cut lengths of wire of predetermined size and connector members connecting the cut lengths of wire together to form the article, the connector members each comprising at least two socket portions each of which receives an end portion of a cut length of wire with a clearance of from 0.05 to 0.254mm, the end portions of the cut lengths of wire

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being adhesively secured in the socket portions of the connector members.

16. A wire article according to claim 15, wherein said clearance is from 0.10 to 0.178mm.

17. A wire article according to claim 15 or 16, wherein said cut lengths of wire are circular in section and have a diameter of not more than 6.0mm.

18. A wire article according to claim 17, wherein the cut lengths of wire have a diameter of from 1.6mm to 3.0mm.

19. A wire article according to any one of claims 15 to 18, comprising a base member having apertures therein in which end portions of at least some of said cut lengths of wire are received.

20. A method of forming a wire article substantially as herein described with reference to the accompanying drawings.

21. A wire article substantially as herein described with reference to Figs. 5A, 5B, 5C or 5D of the accompanying drawings.

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