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(54) Wire articles and method of and kit of parts for forming same.

(57) Wire articles and a method of and kit of parts for forming same, comprising lengths of wire (1) of predetermined size and connector members (2 to 9) connecting or adapted to connect the lengths of wire (1) together. The connector members (2 to 9) each have at least two socket portions each adapted to receive an end portion of a cut length of wire. The wire (1) has a diameter of not more than 6.0mm, preferably 1.6mm to 3.0mm and the socket portions of the connector members (2 to 9) are adapted to receive the end portions of the wire (1) with a clearance of from 0.5 to 0.254mm, preferably 0.10 to 0.178mm. The end portions of the wire (1) are preferably adhesively secured in the connector members (2 to 9).

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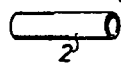


Fig. 2A

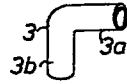


Fig. 2B



Fig. 2C

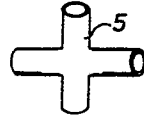


Fig. 2D



Fig. 2E



Fig. 2F

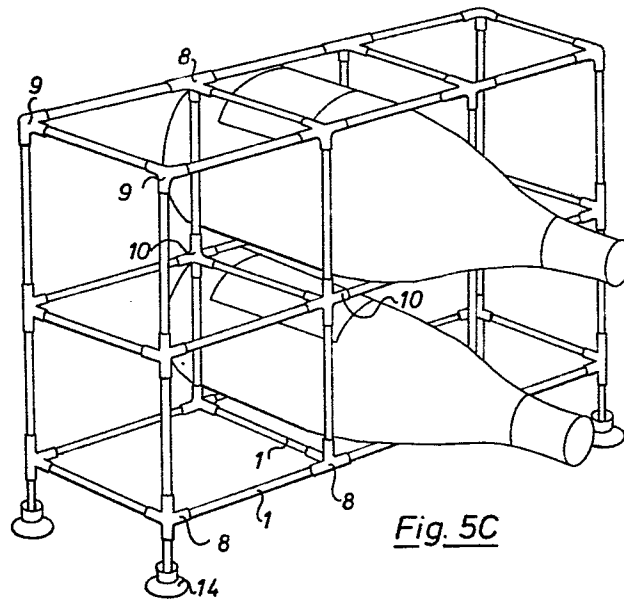


Fig. 5C

WIRE ARTICLES AND METHOD
OF AND KIT OF PARTS FOR FORMING SAME.

This invention relates to wire articles and to a method of and a kit of parts for 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.

The present invention has as its object to provide a method of and a kit of parts for 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, if necessary bending at least one of said cut lengths of wire, 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, and connecting the cut lengths of wire together by means of the connector members to form a required article.

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.

The present invention further provides a kit of parts for forming wire articles, the kit of parts comprising a supply of wire and a plurality of connector members each comprising at least two socket portions each of which is adapted to receive an end portion of the wire.

The supply of wire in the kit of parts may be a continuous length of wire, e.g., a coil or skein of wire, which can be cut into lengths of predetermined size or may be pre-cut into lengths of predetermined size for forming a particular article or articles. The kit of parts may include means for cutting and/or bending the wire

e.g., may include a wire cutting tool or a pair of pliers. The kit of parts may include instructions for cutting, bending and connecting the cut lengths of wire to form a particular article or articles.

The wire used in the method, the article and the kit of parts of the present invention is preferably metal wire which is circular in section and has a diameter of not more than 6.0 mm, 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.

Preferably the method of the present invention includes the further step of securing the end portions of the cut lengths of wire in the socket portions of the connector members by means of a suitable adhesive when connecting the cut lengths of wire together, and to this end the kit of parts may include a supply, e.g., a tube, of suitable adhesive.

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. 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 kit of parts of the present invention

will contain a number of connector members of selected different types sufficient to enable a particular article or articles to be formed.

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 kit of parts may also include one or more feet for supporting an article formed from the kit. 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 a 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. Likewise the kit of parts of the present invention may comprise a base member having apertures therein adapted to receive end portions of the wire.

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

or more shelves and shelf supports, one or more wall brackets whereby an article formed 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 shelf supports, wall brackets or hook members may comprise a sleeve portion through which a cut length of wire can be inserted and which can, if required, be secured at a required position on the cut length of wire by means of a suitable adhesive.

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

Fig. 1 shows cut lengths of wire for use in the method of the present invention,

Figs. 2A to 2K show various kinds of connector members which may form part of a kit of parts according to the present invention,

Figs. 3A to 3C show different kinds of feet which may form part of a kit of parts according to the present invention,

Figs. 4A to 4E show different fixtures and fittings which may form part of a kit of parts according to the invention, and

Figs. 5A to 5D show examples of articles which can be formed with a kit of parts according to the present invention.

A kit of parts according to the present invention comprises a supply of 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 Fig. 1. In addition the kit of parts comprises 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. 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 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 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 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 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 connector 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 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 another.

The kit of parts may further 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 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 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 formed from the kit of parts or as an end cap for capping a free end portion of a cut length of 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 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 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 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 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 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 inserted through the sleeve portion thereof as by means of a suitable adhesive.

It will be understood that a kit of parts according to the present invention may comprise any required combination and any required number of the parts shown in Figs. 2, 3 and 4 sufficient to enable a particular article or articles to be formed. It will also be understood that the fixtures and fittings illustrated in Figs. 4A to 4E are by way of example only and that such other fixtures or fittings as may be desired or



necessary may be included in the kit of parts.

Figs. 5A to 5D show examples of articles made from a kit of parts according to the present invention. In these figures the cut lengths of 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 which would be included in a kit of parts for forming the desk tidy.

The wire 1 used in the kit of parts 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. ($\frac{1}{4}$ inch) and preferably a diameter of 3mm. (one-eighth inch) or 1.6mm. (one-sixteenth inch). The kit of parts 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 accomodate cut lengths of wire of the different cross-sectional configurations and/or thicknesses.

The kit of parts includes a supply, e.g., a tube, of adhesive (not shown) for 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, and connecting the cut lengths of wire together by means of the connector members to form a required article.
2. A method according to claim 1, which comprises 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.
3. A method according to claim 2, wherein the socket portions of said connector members are each adapted to receive an end portion of a said cut-length of wire with a clearance of from 0.05 to 0.254mm.
4. A method according to claim 3, wherein said clearance is from 0.10 to 0.178mm.
5. A method according to any of the preceding claims, wherein the wire stock is circular in section and has a diameter of not more than 6mm.
6. A method according to claim 5, wherein the wire stock has a diameter of from 1.6 mm. to 3.0mm.
7. 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.

8. A method according to any of the preceding claims wherein the wire stock has been provided with a surface finish.
9. A method according to claim 8, wherein the wire stock has been coated with a synthetic plastics material.
10. A method according to claim 8, wherein the wire stock has been coated with a metallic paint or lacquer.
11. A method according to any one of the preceding claims, wherein said connector members are moulded from synthetic plastics material.
12. 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.
13. A method according to claim 12, wherein said at least one connector member is in the form of a hollow tube.
14. 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.
15. 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.
16. A method according to claim 15, which comprises adhesively securing the end portions of the cut lengths of wire in said apertures in said base member.

17. 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.
18. A wire article according to claim 17, wherein the end portions of the cut lengths of wire are adhesively secured in the socket portions of the connector members.
19. A wire article according to claim 18, wherein the end portions of the cut lengths of wire are received in the socket portions of the connector members with a clearance of from 0.05 to 0.254mm.
20. A wire article according to claim 19, wherein said clearance is from 0.10 to 0.178mm.
21. A wire article according to any one of claims 17 to 20, wherein said cut lengths of wire are circular in section and have a diameter of not more than 6.0mm.
22. A wire article according to claim 21, wherein the cut lengths of wire have a diameter of from 1.6mm to 3.0mm.
23. A wire article according to any one of claims 17 to 22, comprising a base member having apertures therein in which end portions of at least some of said cut lengths of wire are received.
24. A kit of parts for forming wire articles, the kit of parts comprising a supply of wire and a plurality of connector members each comprising at least two socket portions each of which is adapted to receive an end portion

of the wire.

25. A kit of parts according to claim 24, wherein said wire is cut into lengths of predetermined size.

26. A kit of parts according to claim 24 or 25, wherein said wire is circular in section and has a diameter of not more than 6.0mm. and wherein said socket portions are each adapted to receive an end portion of the wire with a clearance of from 0.05 to 0.254mm.

27. A kit of parts according to claim 26, wherein the wire has a diameter of from 1.6mm to 3.0mm and wherein said clearance is from 0.10 to 0.178mm.

28. A kit of parts according to claim 26 or 27, which includes a supply of adhesive for adhesively securing end portions of the wire in said socket portions.

29. A kit of parts according to any one of claims 24 to 28, wherein said wire is plastics coated wire.

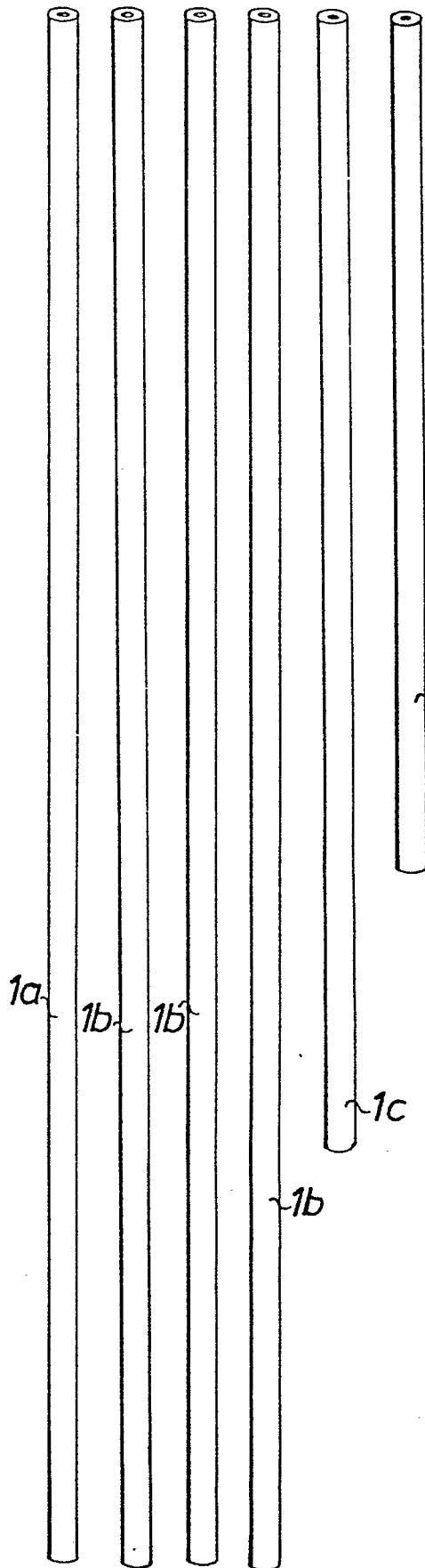


Fig. 1

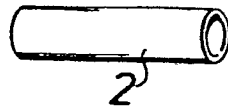


Fig. 2A

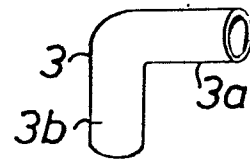


Fig. 2B

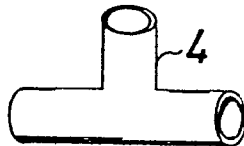


Fig. 2C

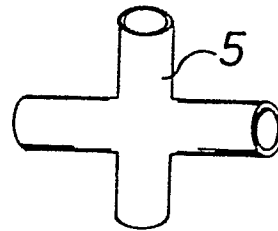


Fig. 2D

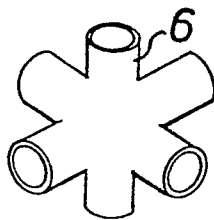


Fig. 2E

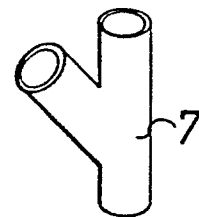


Fig. 2F

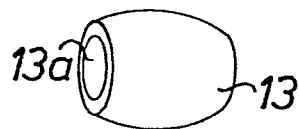


Fig. 3A

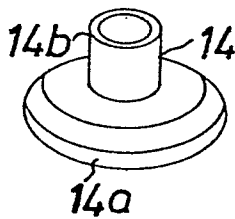


Fig. 3B

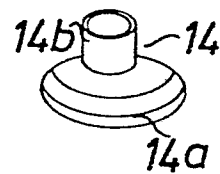


Fig. 3C

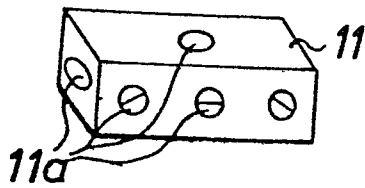


Fig. 2J

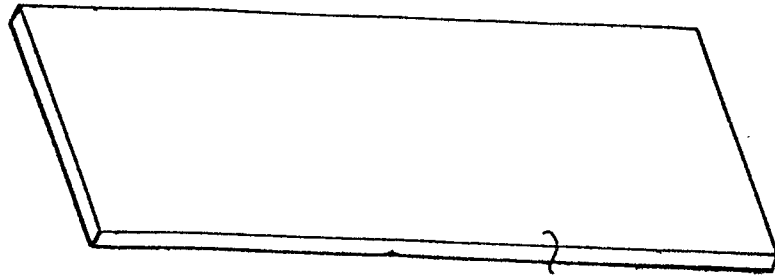


Fig. 4A

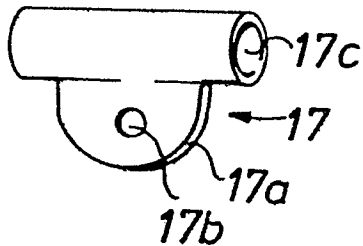


Fig. 4C

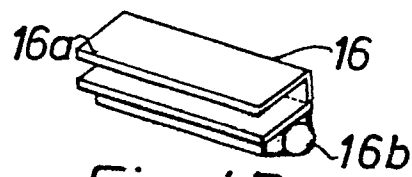


Fig. 4B

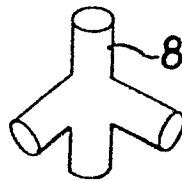


Fig. 2G

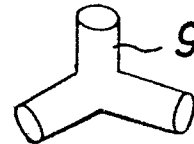


Fig. 2H

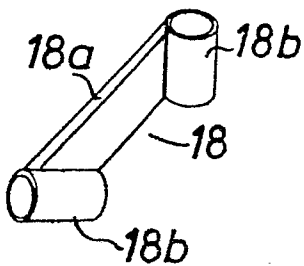


Fig. 4D

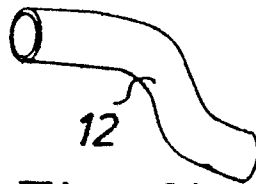


Fig. 2K

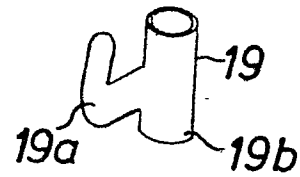


Fig. 4E

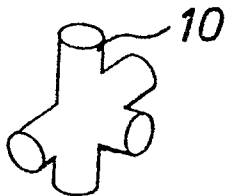
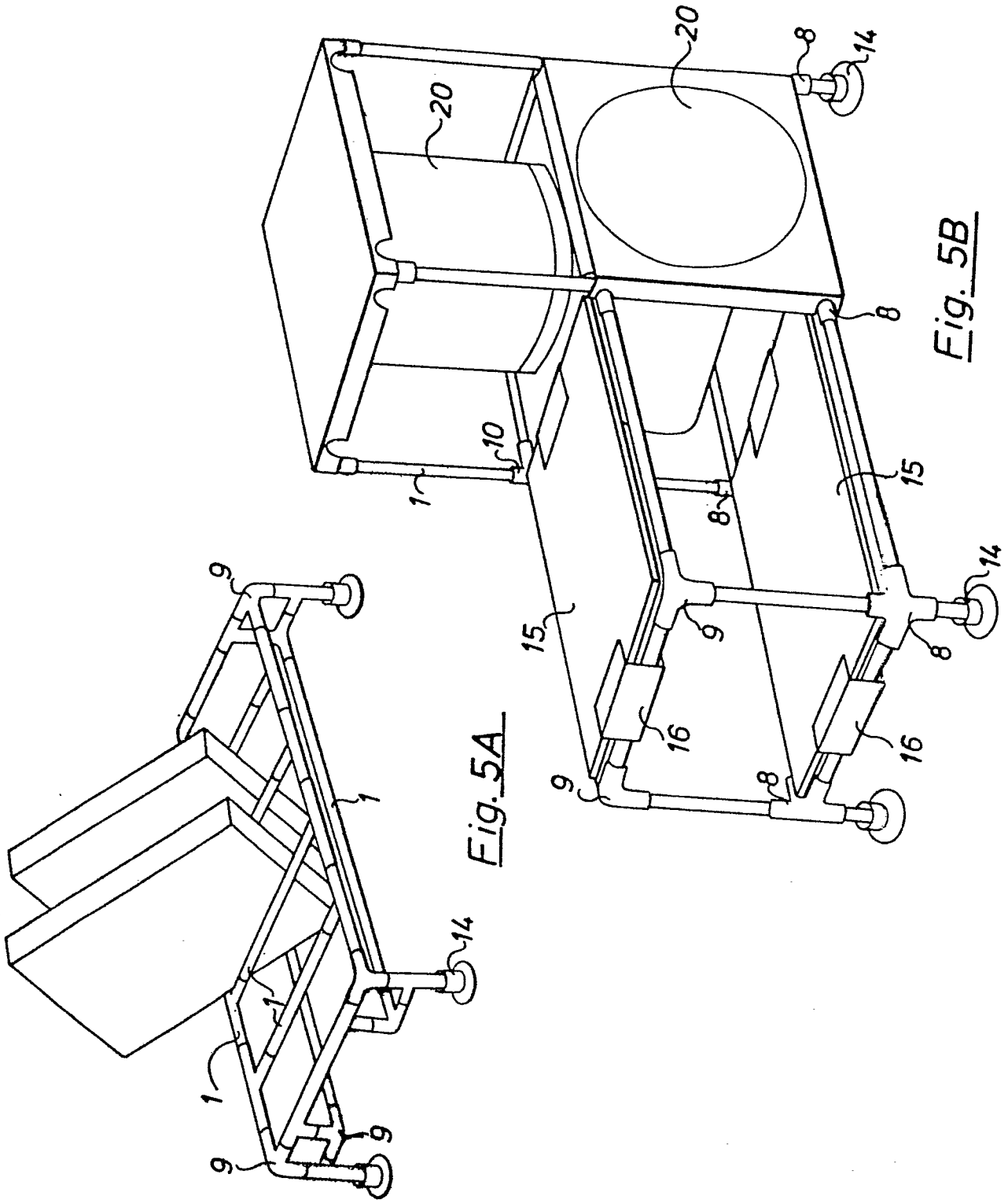


Fig. 2I



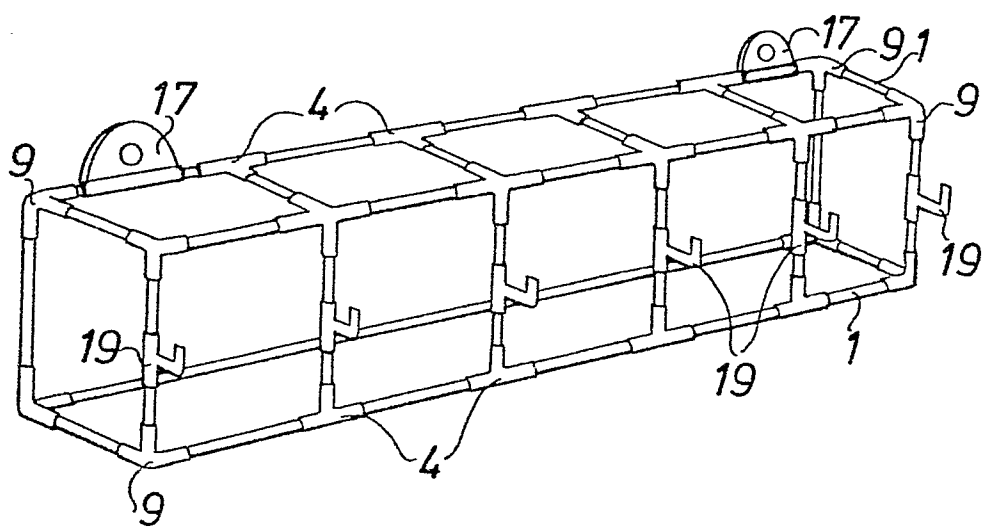


Fig. 5D

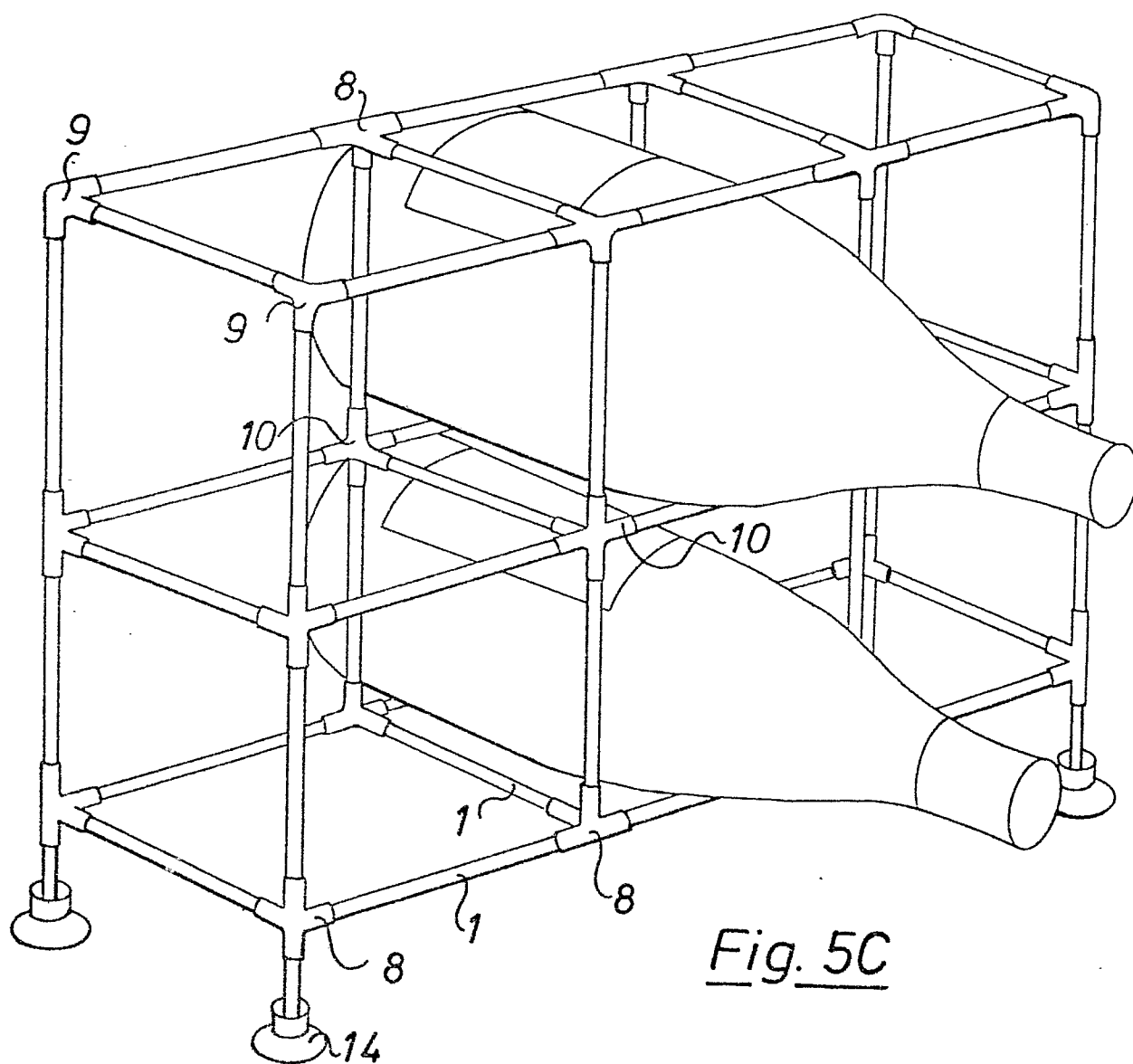


Fig. 5C



European Patent
Office

EUROPEAN SEARCH REPORT

Application number

EP 80 30 1014.9

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.3)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	DE - U - 1 898 069 (BAU-STAHLGeweBE) * claim 1; fig. 1 *	1	B 21 F 15/06 F 16 B 7/00
X	DE - U - 1 833 090 (C. BERTELSMANN) * claim 1; fig. 1, 3 *	1	
	FR - A - 1 162 637 (M. BOURGOGNAT) * claim 1; fig. 3, 6, 8, 12 *	1	
	DE - U - 1 994 798 (W. SCHADE) * claims 1, 2; fig. 1 *	1,9	TECHNICAL FIELDS SEARCHED (Int.Cl.3)
	DE - A1 - 2 521 759 (F. BRYKCZYNSKI) * claim 1; fig. 1 *	1	A 47 B 45/00 B 21 F 15/00 F 16 B 7/00
	DE - A - 2 348 434 (TAKIRON CHEMICAL CO.) * claims 1, 2; fig. 2, 3 *	1	F 16 B 9/00 F 16 B 12/40 F 16 B 12/50
	FR - A - 1 316 970 (THOMSON-HOUSTON) * claim 1; fig. 4, 9 *	1	
A	GB - A - 1 384 369 (E.C. COLE) * complete document *		CATEGORY OF CITED DOCUMENTS
			X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
			&: member of the same patent family, corresponding document
☒ The present search report has been drawn up for all claims			
Place of search Berlin		Date of completion of the search 09-07-1980	Examiner SCHLAITZ