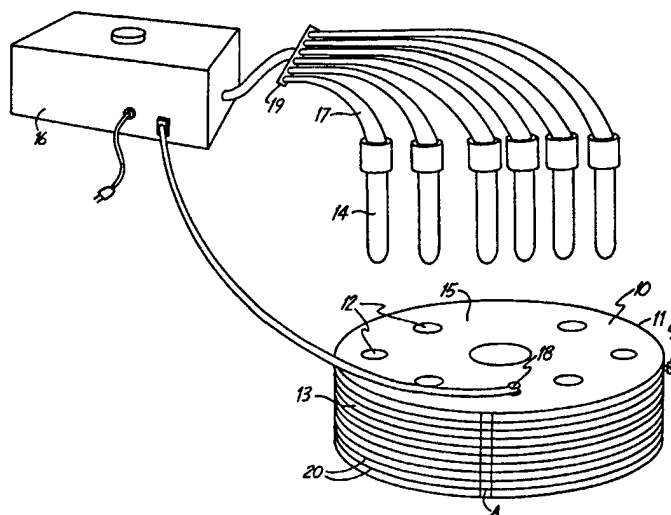


INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(54) Title: ORTHODONTIC ARCHWIRE AND METHOD OF MANUFACTURE



(57) Abstract

A superelastic orthodontic archwire made of an alloy of Nickel Titanium Iron combines substantially low and constant forces with bendability characteristics. This allows the same archwire to be used for all stages of orthodontic treatment. Also disclosed is a method of producing the archwire by winding a suitably shaped mandrel with Nickel Titanium Iron alloy wire and restraining the wire to secure its shape. The mandrel is provided with a plurality of apertures adapted to receive independent heat elements. Heat elements are inserted into the mandrel, and energized. A thermocouple is carried by the mandrel to detect a target temperature, whereupon a controller unit shuts off the heating elements. The heating elements are removed, and the mandrel with attached wires cooled at a suitable rate to maximize the desired characteristics entrained into the wire.

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INTERNATIONAL SEARCH REPORT

Intern. Application No
PCT/US 97/12075

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A61C7/20 C21D1/34

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 A61C C21D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 465 836 A (TOKIN CORP ;TOMY INC (JP)) 15 January 1992 see page 2, line 52 - page 3, line 2 see page 4, line 15 - line 19 see page 4, line 32 - line 34 see figures 3,7	1
A	---	2-9
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	-/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

12 February 1998

Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT

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PCT/US 97/12075

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>US 5 017 133 A (MIURA FUJIO) 21 May 1991 see column 1, line 57 - line 66 see column 2, line 21 - line 30 see column 4, line 62 - column 5, line 10 see column 5, line 21 - line 29 see figures 3,4</p> <p style="text-align: center;">---</p>	1,5
A	<p>US 5 044 947 A (SACHDEVA ROHIT C L ET AL) 3 September 1991 see column 5, line 7 - line 36</p> <p style="text-align: center;">---</p>	1,5
A	<p>WO 95 30385 A (UNIV MINNESOTA) 16 November 1995 see page 6, line 1 - page 7, line 2 see figures 4,5</p> <p style="text-align: center;">---</p>	10-18
A	<p>US 4 465 912 A (BRETTBACHER FRANZ ET AL) 14 August 1984 see column 3, line 30 - column 4, line 18 see figure 20</p> <p style="text-align: center;">-----</p>	10-18

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 97/ 12075

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

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because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
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Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

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2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
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Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

1. Claims : 1-9
Orthodontic archwire of specified alloy composition exhibiting semisuperelastic properties.
2. Claims : 10-18
Apparatus and method for heat treating any object to give it a desired shape.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 97/12075

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