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(71) Applicant (for all Designated States except USA):  
**MICRO-MEGA (SOCIETE ANONYME [LIMITED COMPANY])** [FR/FR]; 12 rue du Tunnel, F-25000 Besançon (FR).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **BADOZ, Jean-Marie** [FR/FR]; Rue de la Chaussée, F-25300 Doubs (FR).

(74) Agent: **POUPON, Michel**; Cabinet Michel Poupon, 3, rue Ferdinand Brunot, F-88026 Epinal Cedex (FR).

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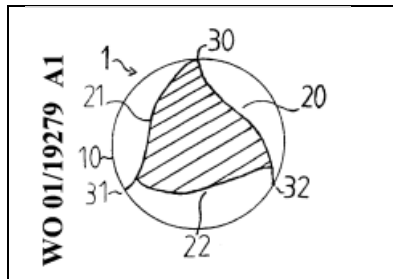
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(54) Title: ROOT CANAL INSTRUMENT SUCH AS A ROOT-CANAL REAMER AND METHOD FOR MAKING SAME



(57) Abstract: The invention concerns a root-canal instrument (1) such as a root-canal reamer, comprising a working section (10) including three flutes (20, 21, 22) forming three cutting lips (30, 31, 32). The invention is characterized in that the three cutting lips (30, 31, 32) are located at the apices of an isosceles triangle. The invention further concerns various methods for making the inventive root-canal instrument (1).

**Root-canal instrument such as a root-canal reamer and method for making same**

5 The present invention concerns the field of production of endodontic instruments for the preparation of root canals, and more specifically root-canal instruments of the root-canal reamer type, comprising a working section called a “blade”, including three flutes forming three cutting lips.

The prior art already includes root-canal instruments comprising a working section including three flutes forming three cutting lips.

In particular, the prior art includes this type of instrument in French patent applications no. 96 04987 and 96 14347.

10 The instruments described in the aforementioned patent applications have a circular symmetry in the order of three or more, depending on the number of cutting lips on the instrument.

As such, when the instrument is used in rotation in a curved root canal, the instrument follows the axis of the canal due to the balance of the forces applied to the instrument.

15 This type of instrument is satisfactory except when the canal cannot be treated as a hole of circular cross-section. In this latter case, the forces applied during the preparation of the canal are no longer balanced and the trajectory of the instrument may deviate with respect to the axis of the root canal. This deviation may have very serious consequences, since it can lead to the creation of a directional mishap or even a perforation of the canal.

20 The present invention is intended to remedy the drawbacks of the prior art by proposing an instrument whose blade alleviates this risk. This goal is attained by intentionally breaking the circular symmetry of the instrument, so that the tip of the instrument is able to search for the root canal and penetrate it naturally, since the bending resistance of the blade is no longer the same in all directions.

25 As such, the root-canal instrument, in accordance with the invention, comprises a working section including three flutes forming three cutting lips, and it is characterized in that the three cutting lips are located at the apices of a triangle, which is not equilateral, but rather isosceles.

30 The present invention also refers to different methods to make the root-canal instrument in accordance with the invention.

The invention can be better understood using the description made hereinafter of an implementation mode given by way of example but without limitation, in reference to the appended figures, in which:

- 5 - Figure 1 shows a cross-section view of a root-canal instrument of the prior art, whose three cutting lips are located at the apices of an equilateral triangle;
- Figure 2 shows a cross-section view of a root-canal instrument in accordance with the present invention, obtained by means of a first method for making the same;
- Figure 3 shows a cross-section view of a root-canal instrument in accordance with the present invention, obtained by means of a second method for making the same; and
- 10 - Figure 4 shows a cross-section view of a root-canal instrument in accordance with the present invention, obtained by means of a third method for making the same.

In accordance with the present invention, the root-canal instrument (1) is of the root-canal reamer type, comprising a working section (10) including three flutes (20, 21, 22) forming three cutting lips (30, 31, 32). It is characterized by the fact that the three cutting lips (30, 31, 32) are  
15 located at the apices of an isosceles triangle.

As with all root-canal instruments of this type, the instrument according to this invention possesses a working section (10), also known as a “blade”, whose active part is obtained by grinding and has a conical shape also obtained by grinding. The conical shape is obtained most frequently by gradually moving the grinding wheel away from the axis of the instrument as one  
20 moves away from the tip of the instrument.

A root-canal instrument (0) of the prior art, obtained by milling three identical flutes (20, 21, 22), forming three cutting lips (30, 31, 32), arranged at 120° angles from each other, is shown in Figure 1.

The present invention also refers to different methods for making the root-canal  
25 instrument in accordance with the invention.

The first possibility for making the instrument (1) in accordance with the invention consists in making two flutes (20, 21) by conducting two successive, identical milling operations, at 120°, and then making the third flute (22) by

conducting a third milling at a greater depth than the first two, as shown in Figure 2.

It is also possible to make the depth of the third flute (22) such that it is greater than that of the first two flutes (20, 21) at the tip of the working section (10) of the instrument, then becomes identical to the depth of the first two flutes (20, 21).

5           The depth of the third flute (22) may become identical to that of the first two flutes (20, 21) either at the end of the working section (10), or before the end of the working section (10).

10           A second possibility for making the instrument (1) in accordance with the invention consists in making two flutes (20, 21) by conducting two successive, identical milling operations, at an angle greater than  $120^\circ$ , and then making the third flute (22) by conducting a third milling operation as a complement to the first two, as shown in Figure 3.

15           A third possibility for making the instrument (1) in accordance with the invention consists in making two flutes (20, 21) by conducting two successive, identical milling operations, at an angle less than  $120^\circ$ , and then making the third flute (22) by conducting a third milling operation as a complement to the first two, as shown in Figure 4.

## CLAIMS

- 1 - Root-canal instrument (1) of the root-canal reamer type, comprising a working section  
5 (10) including three flutes (20, 21, 22) forming three cutting lips (30, 31, 32), characterized in that the three cutting lips (30, 31, 32) are located at the apices of an isosceles triangle.
- 2 - Method for making a root-canal instrument (1) in accordance with claim 1, characterized by the fact that two flutes (20, 21) are made by conducting two successive, identical milling operations, at 120° with respect to each other, and then the third flute (22) is made by conducting  
10 a third milling operation at a greater depth than the first two.
- 3 - Method for making a root-canal instrument (1) in accordance with claim 2, characterized by the fact that the third flute (22) is deeper than the two flutes (20, 21) at the tip of the working section (10) of the instrument, then becomes identical to the depth of the first two flutes (20, 21).
- 4 - Method for making a root-canal instrument (1) in accordance with claim 1, characterized  
15 by the fact that two flutes (20, 21) are made by conducting two successive, identical milling operations, at an angle greater than 120° with respect to each other, and then the third flute (22) is made by conducting a third milling operation as a complement to the first two.
- 5 - Method for making a root-canal instrument (1) in accordance with claim 1, characterized by the fact that two flutes (20, 21) are made by conducting two successive, identical milling  
20 operations, at an angle less than 120° with respect to each other, and then the third flute (22) is made by conducting a third milling operation as a complement to the first two.

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