

(21) Application No 8105893

(22) Date of filing
25 Feb 1981

(30) Priority data

(31) 80/07371

(32) 4 Mar 1980

(33) United Kingdom (GB)

(43) Application published

28 Oct 1981

(51) INT CL³ G21C 19/36

(52) Domestic classification
G6R 8A

(56) Documents cited

GB 1397593

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(58) Field of search

B3W

B5L

G6R

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(54) Nuclear fuel reprocessing

(57) A simple friction device for cutting nuclear fuel wrappers (5) comprising a thin metal disc (1) clamped between two large diameter clamping plates (2, 9). A stream of gas ejected from a nozzle (7) is used as coolant. The device may be maintained remotely.

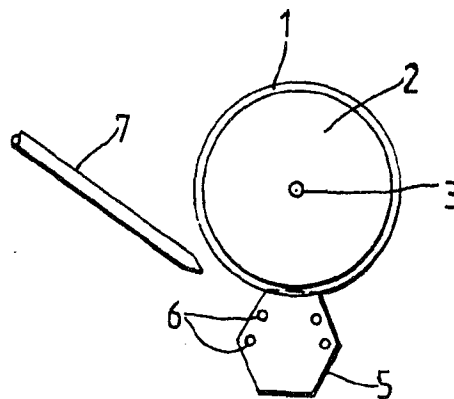


Fig. 1

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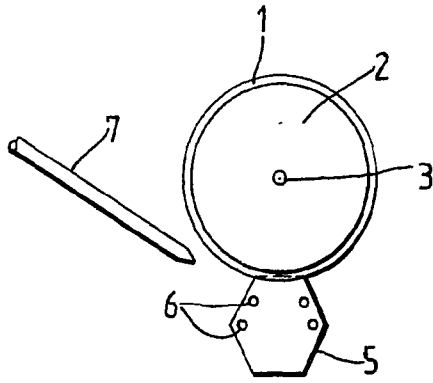


Fig. 1

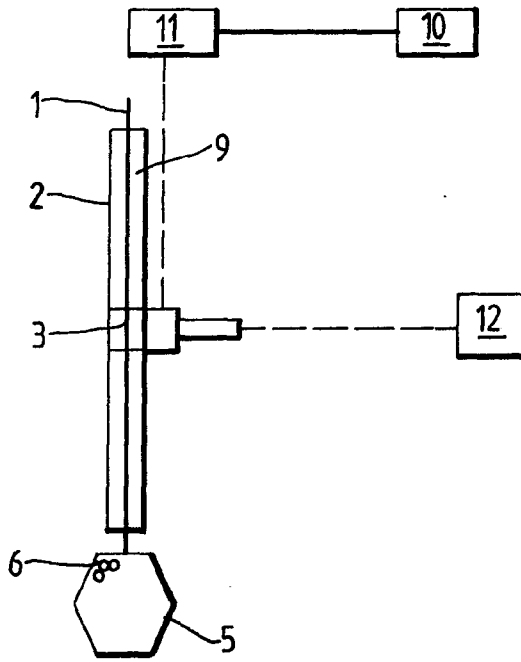


Fig. 2

SPECIFICATION

Nuclear fuel reprocessing

5 This invention relates to nuclear fuel processing. It is necessary to cut the wrappers and grids of nuclear fuel assemblies before reprocessing can take place. An accurate apparatus for this cutting is desired since damage to adjacent fuel pins must be avoided and minimum swarf and debris must be created.

10 An object of the present invention is to provide a suitable apparatus.

15 According to the present invention, apparatus for cutting irradiated nuclear fuel pin wrappers or grids prior to fuel reprocessing comprises a cutting disc, clamp means for holding the disc, means for rotating the disc and jet means for providing a fluid jet towards an area being cut.

20 Preferably, the clamp means comprises two circular plates attachable on either side of the cutting disc, respectively. Preferably, the cutting disc is fabricated from metal. Preferably, thickness of the cutting disc is in the region of 0.25 mm.

25 An embodiment of the present invention will now be described by way of example only with reference to the accompanying drawings in which:

30 *Figure 1* is a side view, and

Figure 2 is a diagrammatic end view showing a different cutting mode.

35 Reference is made firstly to Fig. 1, wherein a cutting disc of, for example 0.25 mm thickness is indicated by 1. A clamping plate for the disc is indicated by 2 and a spindle upon which the disc rotates by 3. A wrapper 5 is shown around fuel pins 6. In practice, there would be hundreds of fuel pins within the wrapper of, for example, a liquid metal-cooled fast reactor. The cutting disc, fuel wrapper and fuel pins are not drawn to scale. The cutting disc is shown cutting into the fuel wrapper 5. A jet of fluid coolant is provided from a nozzle 7.

45 Reference is directed to Fig. 2, wherein like reference numerals are used for like parts and the cutting disc is shown cutting orthogonally to its cutting direction in Fig. 1. A clamping plate 9 cooperates with the clamping plate 2 to hold the cutting disc in position. The high speed rotation of the cutting disc is effected by a motor 10 via a gearbox 11. Cutting disc positioning controls are indicated by 12. The controls 12 are operated remotely.

50 In use, the cutting disc is rotated at speeds sufficient to cut the fuel wrapper or a fuel grid and manoeuvred into position for cutting the wrapper or grid, which is then cut. Maintenance work on the cutting equipment is simply replacement of a cutting disc which is an operation which is itself simple and carried out remotely

65 The cutting disc 1 is conveniently metallic

and owing to its thinness, the width of cut and amount of debris is less than would occur if a non-metallic disc of, for example, carborundum were to be used. Also, problems of fracture associated with non-metallic discs are mitigated.

70 From the above description, it can be seen that an improved apparatus for cutting irradiated nuclear fuel pin wrappers or grids prior to reprocessing is provided.

CLAIMS

1. Apparatus for cutting irradiated nuclear fuel pin wrappers or grids prior to fuel reprocessing comprising a cutting disc, clamp means for holding the disc, means for rotating the disc and jet means for providing a fluid jet towards an area being cut.

80 2. Apparatus as claimed in Claim 1, in which the clamp means comprises two circular plates attachable on either side of the cutting disc, respectively.

3. Apparatus as claimed in Claim 1 or 2, in which the cutting disc is fabricated from metal.

90 4. Apparatus as claimed in any one of the preceding claims, in which thickness of the cutting disc is 0.25 mm.

5. Apparatus for cutting irradiated nuclear fuel pin wrappers or grids substantially as hereinbefore described and as shown in the accompanying drawings.