

[54] **ASSEMBLY FOR USE IN ATOMIC
ABSORPTION SPECTROSCOPY**

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[22] Filed: **Oct. 3, 1973**

[21] Appl. No.: **403,115**

[30] **Foreign Application Priority Data**

Oct. 23, 1972 United Kingdom..... 48671/72

[52] U.S. Cl..... **356/85, 356/244**

[51] Int. Cl..... **G01j 3/30**

[58] Field of Search..... **356/85, 86, 244**

[56] **References Cited**

UNITED STATES PATENTS

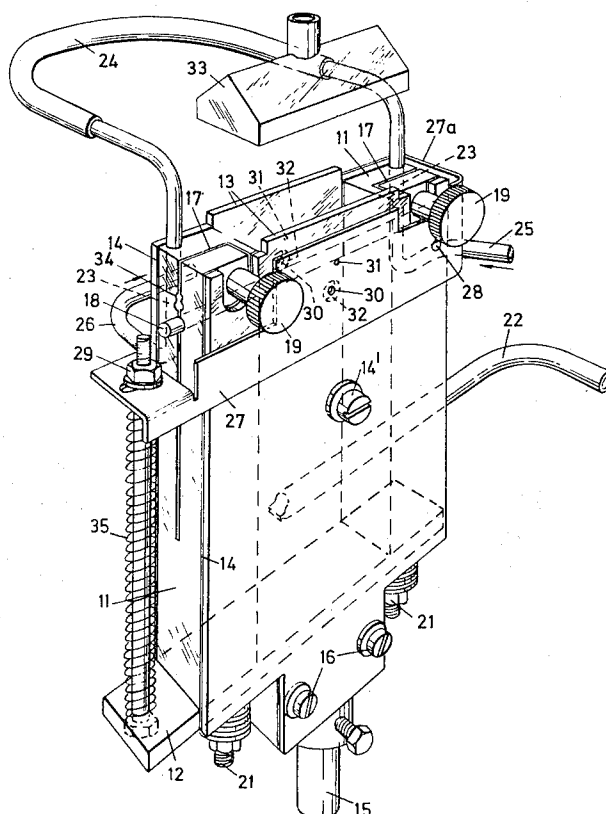
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[57] **ABSTRACT**

An atomic vapour source which includes two spaced metal pillars clamped between but electrically insulated from two plates defining a chamber therebetween, each pillar being adapted at one end to be clamped to one end of carbon rod extending between the ends of the two pillars, the clamping ends of the pillars being free to move relative to one another to permit expansion and contraction of the carbon rod when heated and cooled.

8 Claims, 3 Drawing Figures



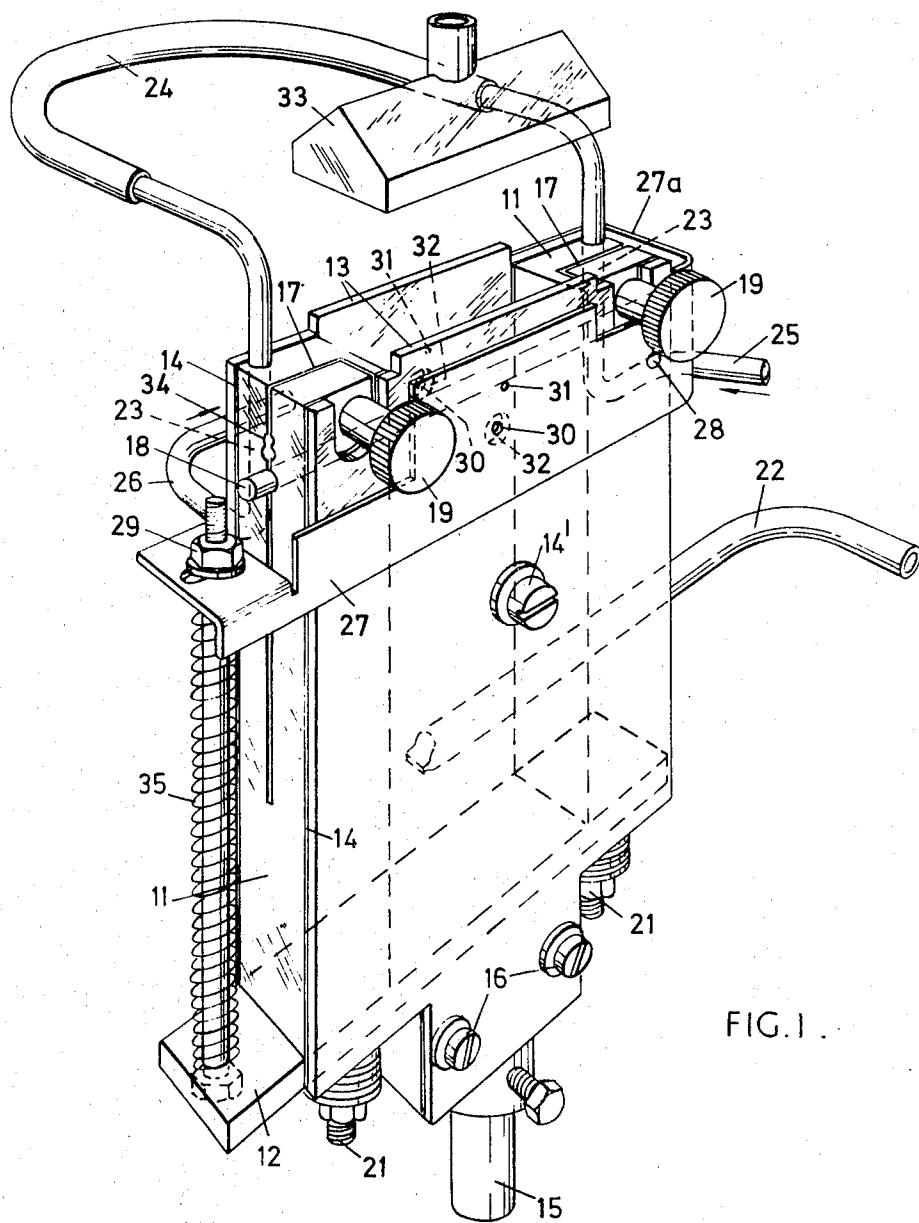
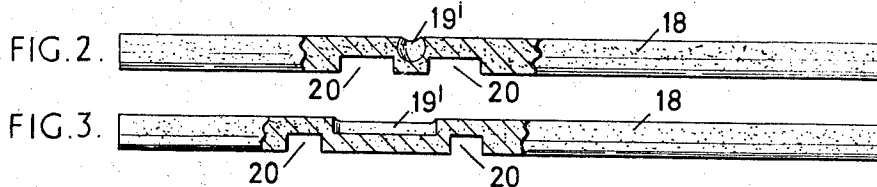


FIG. 1.



ASSEMBLY FOR USE IN ATOMIC ABSORPTION SPECTROSCOPY

This invention relates to sources for creating atomic vapour of a sample for the purpose of conducting experiments in atomic absorption spectroscopy, and it is an object of the present invention to provide an improved source for this purpose.

The present invention consists in an atomic vapour source which includes two spaced metal pillars clamped between but electrically insulated from two plates defining a chamber therebetween, each pillar being adapted at one end to be clamped to one end of a carbon rod extending between the ends of the two pillars, the clamping ends of the pillars being free to move relative to one another to permit expansion and contraction of the carbon rod when heated and cooled.

In the accompanying drawings:

FIG. 1 is a general view of one form of atomic vapour spaced to the present invention, and

FIGS. 2 and 3 show two alternative forms of carbon rod for use in the apparatus of FIG. 1.

In carrying the invention into effect according to one convenient mode by way of example, an atomic vapour source includes two spaced vertical metal pillars 11 fixed at their bottom ends to an electrically insulating cross bar 12.

The two pillars 11 are clamped between two metal side plates 13 by means of a bolt 14 so as to define an enclosure or chamber between the pillars 11, the pillars being electrically insulated from the plates by strips 14 of electrically insulating material such as "Teflon" strip. Plates 13 are also fixed to a support column 15 by means of bolts 16.

Each pillar 11 is provided with a slit 17 and a horizontal bore in which is clamped one end of a carbon rod 18 by means of screws 19.

FIGS. 2 and 3 show portions of two alternative forms of carbon rod 18 each of which is provided with a hollowed out cavity 19' and two cut-away portions 20 underneath the rods so that when an electric current is passed through the rod, heating of the rod will be concentrated around cavity 19' and to each side thereof for a distance sufficient to minimise memory effects.

Since both pillars 11 are electrically insulated from the rest of the structure, an electrical current may be passed through the rod 18 by means of terminals 21 at the bottom ends of the pillars 11, and since the upper ends of the pillars are not directly fixed in relation to one another linear expansion of the rod 18 when heated up rapidly by the current may be taken up by slight movement apart of the upper ends of the pillars 11 as permitted by flexing of the cross bar 12. In use temperature rises of up to 3000°C in one-half sec. may be encountered.

A conduit 22 is provided for introducing an inert gas such as nitrogen or argon into the lower part of the enclosure between pillars 11, which part may be filled with glass beads or some suitable mesh arrangement to diffuse the gas flow. The pillars 11 are arranged to be cooled by means of cooling fluid passing through bores 23 in the pillars, interconnected by conduit 24 and having an inlet 25 and outlet 26.

The apparatus is provided with a mask or yoke 27

movable about a pivoted connection 28 to the plate 13 (but insulated from pillars 11) by means of adjusting nut 29 acting against compression springs 35 so that either apertures 30 or apertures 31 of different size in mask 27 may be brought into alignment with apertures 32 in plates 13 as desired.

In use, a small quantity of sample solution is dropped into cavity 19' in the rod 18 and a cover 33 is provided with a venting chimney fitted across the upper margins of plates 13. A small current is then passed through the rod 18 to drive off solvent, then a larger current can be used to drive off organic matter, if present, and then finally a still larger current is passed through the rod to create a region of atomic vapour of the sample above the rod.

Radiation is directed through this region via apertures 32 and either apertures 30 or 31 to permit atomic absorption measurements to be effected.

Apertures 34 are provided in the sides of the pillar 11 to permit radiation to be directed longitudinally of the rod 18, with a corresponding aperture in the end portion 27a of the yoke 27.

I claim:

1. An atomic vapour source which includes two spaced metal pillars clamped between but electrically insulated from two plates defining a chamber therebetween, each pillar being adapted at one end to be clamped to one end of a carbon rod extending between the ends of the two pillars, the clamping ends of the pillars being free to move relative to one another to permit expansion and contraction of the carbon rod when heated and cooled, said carbon rod provided with means for receiving a sample to be observed, means for directing radiation towards said sample, and means for effecting atomic absorption measurements.

2. An atomic vapour source as claimed in claim 1, wherein the ends of the pillars remote from their clamping ends are fixed to a cross bar or member, so as to be electrically insulated from one another, the cross-bar or member being sufficiently flexible to permit said relative movement of the clamping ends of the pillars.

3. An atomic vapour source as claimed in claim 2, wherein one cross-bar or member and the plates are fixed to a common support member.

4. An atomic vapour source as claimed in claim 1, wherein the pillars are electrically insulated from the plates by means of strips of electrically insulating material.

5. An atomic vapour source as claimed in claim 1, wherein means are provided for circulating cooling fluid through bores in the pillars.

6. An atomic vapour source as claimed in claim 1, wherein means are provided for introducing an inert gas into the said chamber.

7. An atomic vapour source as claimed in claim 1, wherein the plates are provided with aligned apertures to permit radiation to be directed through the chamber above the carbon rod.

8. An atomic vapour source as claimed in claim 1, wherein apertures are provided in the pillars to permit radiation to be directed through the chamber longitudinally of the carbon rod.

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