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# United States Patent [19]

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**Kambin**

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[54] **UNILATERAL BIPORTAL PERCUTANEOUS SURGICAL PROCEDURE**

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[73] Assignee: **Smith & Nephew Dyonics, Inc.**, Andover, Mass.

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[21] Appl. No.: **784,693**

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[22] Filed: **Oct. 30, 1991**

Schreiber et al, Clin. Orth. Rel. Res., 283, Jan. 1989, pp. 35-42.

[51] Int. Cl.<sup>6</sup> ..... **A61M 31/00**; A61M 5/00; A61B 10/00

[52] U.S. Cl. .... **604/51**; 604/22; 604/116; 604/170; 128/753; 128/754; 128/DIG. 26; 606/61; 606/130

[58] Field of Search ..... 604/51, 116, 117, 170, 604/174, 22; 128/DIG. 26, 749-755, 898; 606/130, 61

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*Attorney, Agent, or Firm*—Pravel, Hewitt, Kimball & Krieger

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### [57] ABSTRACT

A method of percutaneously emplacing at least two cannulae in a patient, such as for percutaneous decompression of a herniated disc, using a guide secured to one cannula to index a second cannula as it is percutaneously advanced into the body. The guide may take the form of jigs adapted to be secured to one cannula with bores arranged to slidingly receive a guidewire or a cannula.

8 Claims, 3 Drawing Sheets

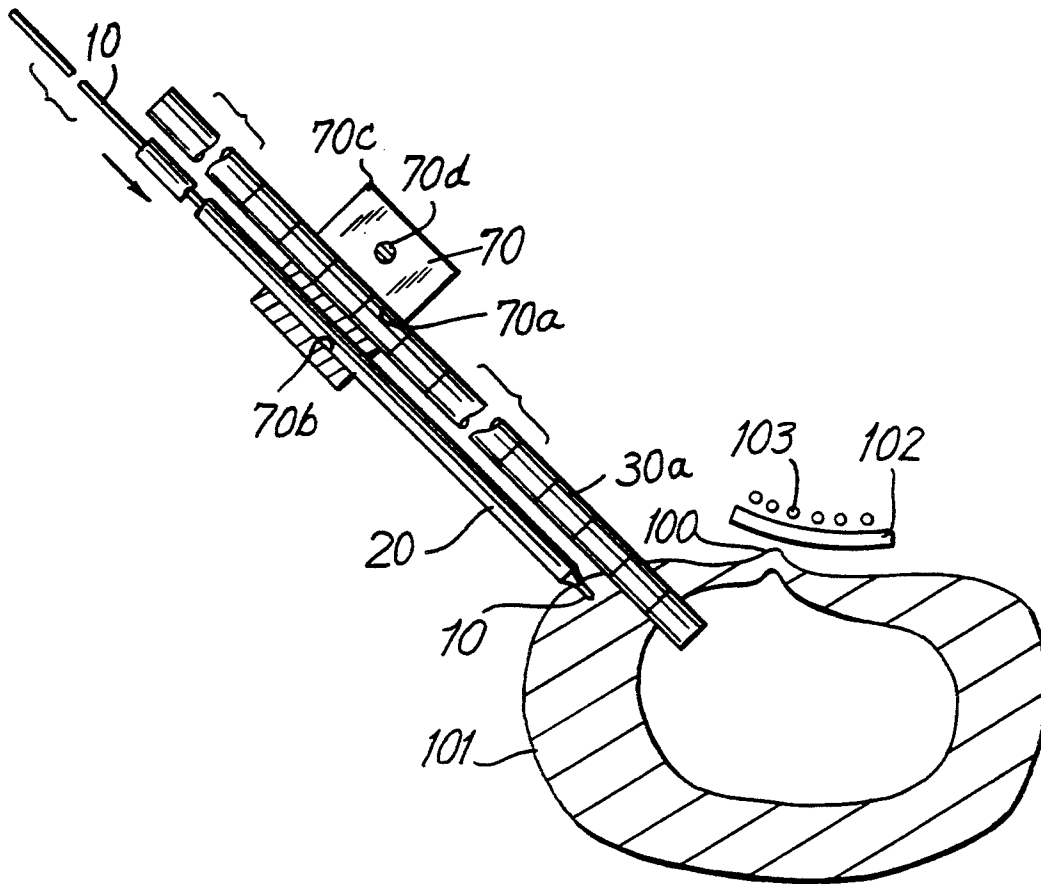


FIG. 1

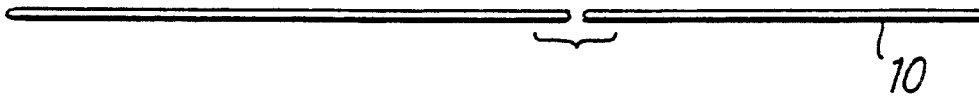


FIG. 2

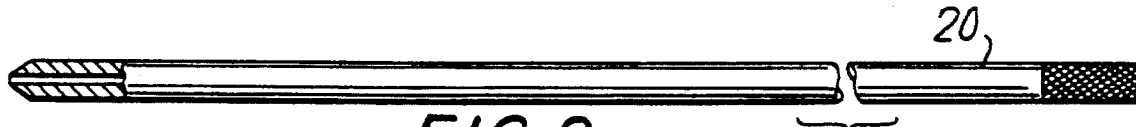


FIG. 3

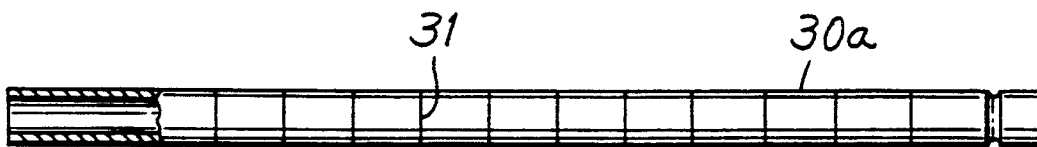


FIG. 4

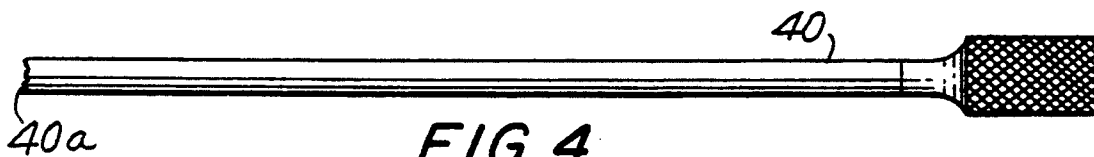


FIG. 5

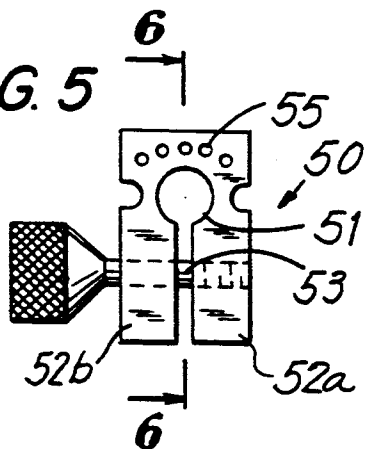
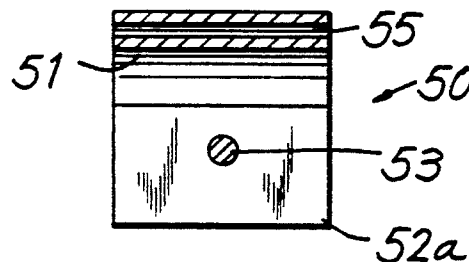
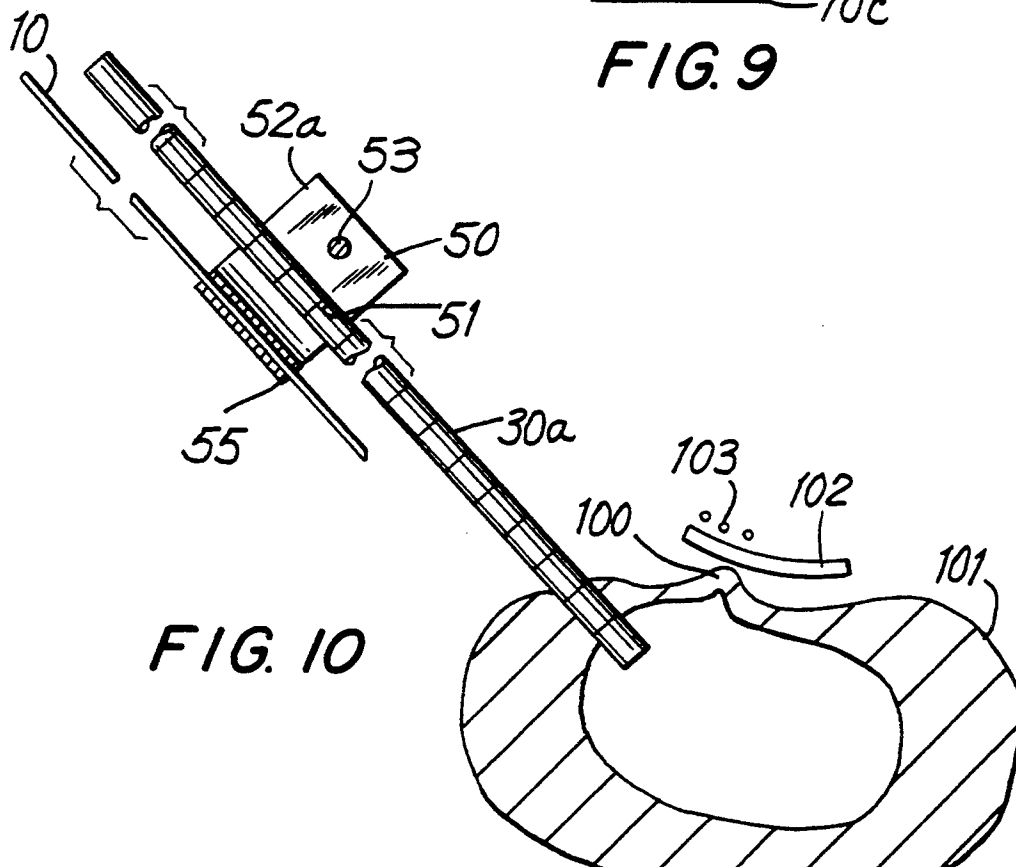
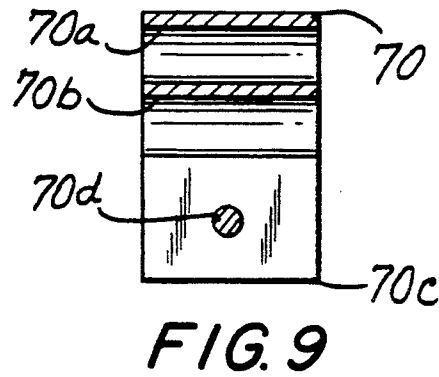
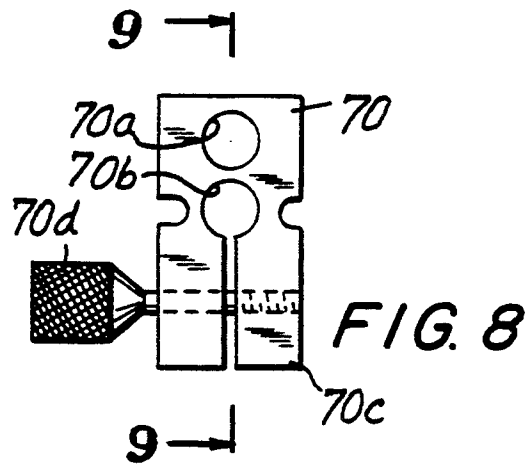
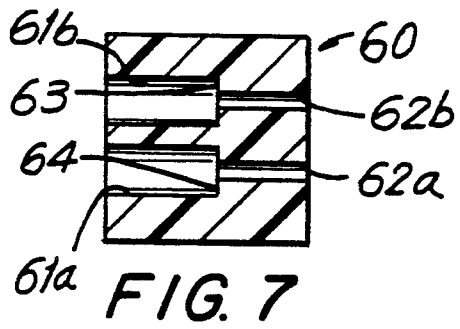
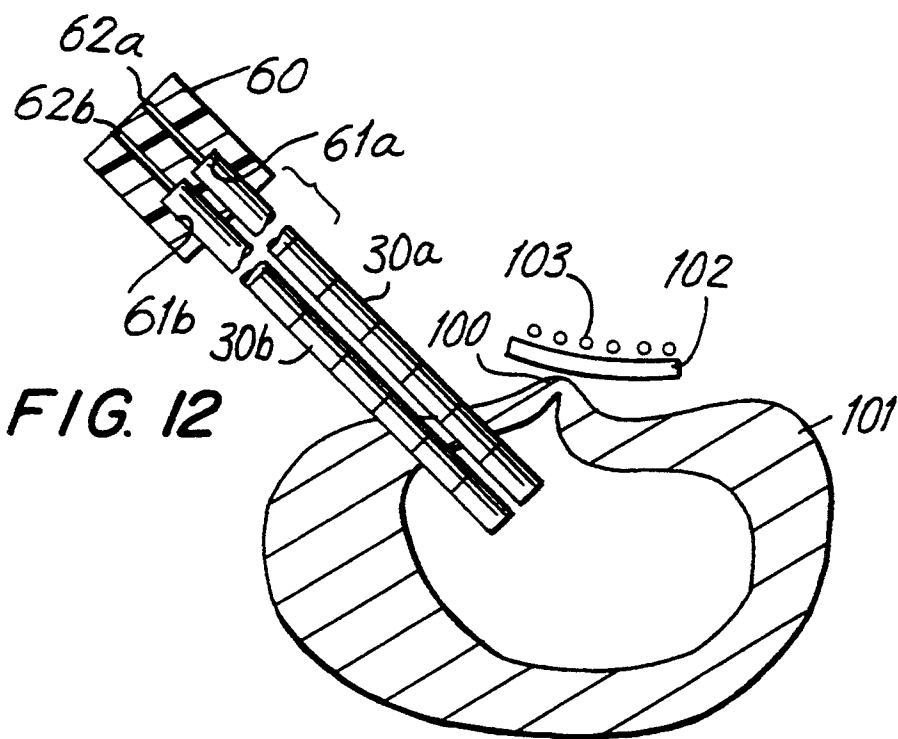
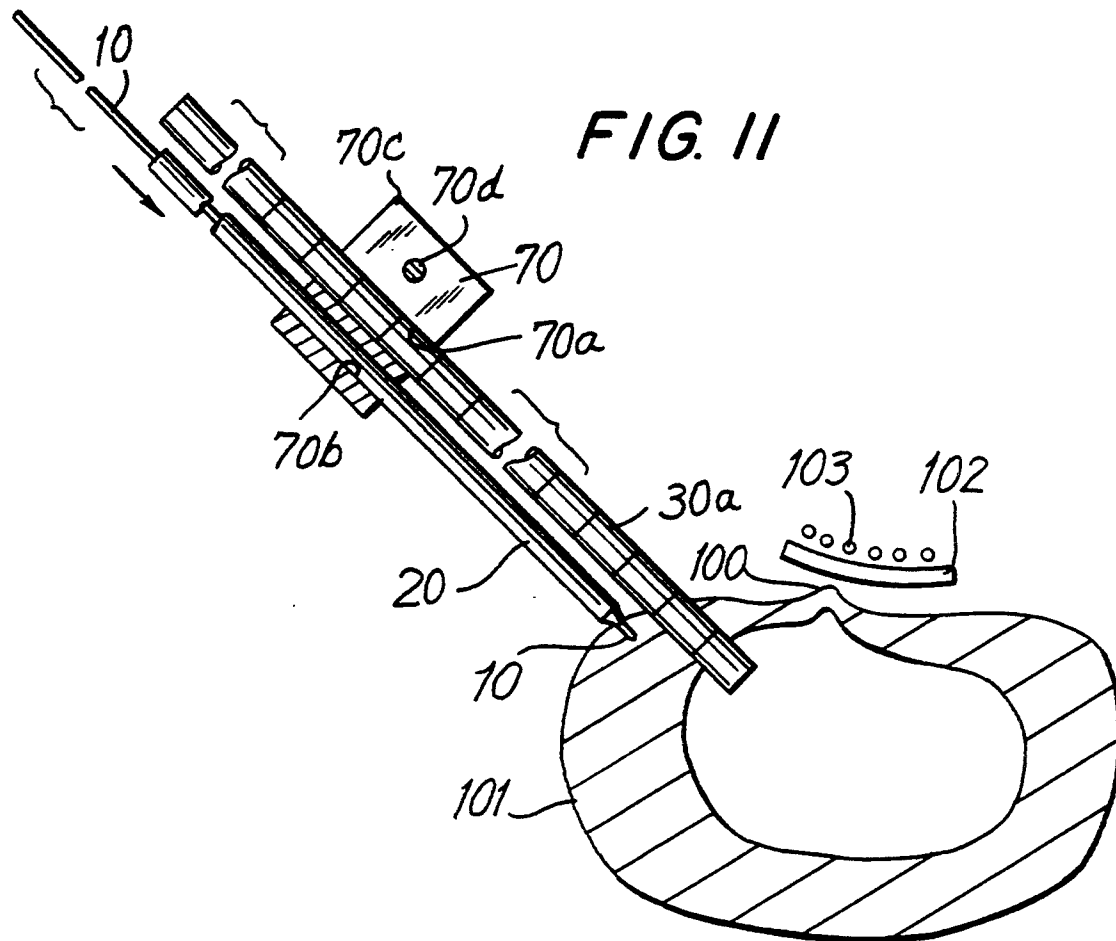


FIG. 6







## UNILATERAL BIportal PERCUTANEOUS SURGICAL PROCEDURE

This invention relates to surgery and specifically to a novel method for accessing herniated intervertebral discs in a human patient.

Low back pain syndrome with sciatica secondary to herniated intervertebral discs represents a major health problem in the United States. An intervertebral disc is a structure which occupies the space between the vertebrae and acts, among other things, as a shock absorbing cushion. A normal disc consists of two parts: a central part known as the "nucleus" and a surrounding part known as the "annulus" or "annulus fibrosis". The annulus degenerates with age, as does the nucleus. Degeneration of the disc is characterized by collagenation, in which some of the fluid content of the nucleus is lost and fragments of collagenized fibrous tissue are formed which float in the tissue fluid. At this stage of degeneration, external forces can readily increase the hydrostatic pressure on the nucleus, causing the fibers of the annulus to rupture. Nucleus fragments protrude. This, in turn, may cause pressure on the adjacent nerve root with resultant pain. Degeneration of the disc may also be caused by other factors, for example, by accidental injury.

Several methods of treatment already exist. One method, usually referred to as "laminectomy" involves the surgical excision of the symptomatic portion of the herniated disc. This method of treatment has been used for many years, however, typical hospitalization time is nine days. Microsurgery has also been used in the treatment of herniated discs, in a procedure known as "micro-lumbar discectomy." This microsurgical procedure, although less invasive, nevertheless carries with it many of the complications associated with the older procedure, including injury to the nerve root and dural sac, perineural scar formation, reherniation at the site of the surgery, and instability due to excess bone removal. Another method of treatment is known as chemonucleolysis, which is carried out by injection of the enzyme chymopapain into the disc structure. This procedure has many complications including severe pain and spasm, which may last up to several weeks following injection. Sensitivity reactions and anaphylactic shock occur in limited but significant numbers of patients.

A further method of treatment, automated percutaneous lumbar discectomy, utilizes a specially designed needle which is inserted into a ruptured disc space. The nucleus of the disc is removed by suction instead of open surgery.

Another method of treatment is discussed in U.S. Pat. No. 4,573,448 and involves the percutaneous evacuation of fragments of the herniated disc through an access cannula positioned against the annulus of the herniated disc. A measure of safety and accuracy is added to this operative procedure by the arthroscopic visualization of the annulus and other important structures which lie in the path of the instruments, such as the spinal nerve. While a considerable improvement over the existing procedures, nevertheless, this procedure does not enable the surgeon to directly view the resection of posterior nuclear fragments. That is, the internal diameter of the access cannula as described in U.S. Pat. No. 4,573,448 limits the design of an operating discoscope and limits the type and size of instruments that would

allow for the visualization and simultaneous suction, irrigation and resection of the nuclear material.

The introduction of a second portal to the annulus from the opposite side of a first portal has been reported by Schreiber and his co-workers in *Clinical Orthopaedics and Related Research*, Number 238, page 36, January 1989. However, this bilateral, biportal procedure increases the operating room time, exposure to radiation by physician, patient and operating room personnel and also increases post-operative morbidity by involving both sides of the back and may cause excessive removal of nuclear material which increases the possibility for stenosis of the foramen and nerve root compression.

Thus, there is a need in the art for a percutaneous procedure to create an accessory unilateral portal in the annulus adjacent to an already positioned access cannula with a minimal additional exposure of the patient, physician and operating room staff to radiation and without unduly prolonging time spent in the operating room. A unilateral, biportal approach will allow for continuous visualization, identification and extraction of nuclear fragments from the disc under discoscopic control. Large central herniations and partially extruded fragments may be visualized and evacuated. Such a unilateral approach to place more than one percutaneous portal in, for example, the L5-S1 vertebral joint, is also highly desirable because this procedure requires deflection of the patient's spine to enable access on the one side, causing a corresponding restriction of access on the opposite side. Moreover, by using a unilateral biportal approach, instruments do not need to traverse across the disc nucleus from a second portal remote from the symptomatic side. Therefore, the amount of non-symptomatic nuclear material removed by the unilateral approach is decreased as compared to the bilateral, biportal approach. This is important in preventing collapse of disc space, which results in nerve compression and stenosis of the spinal canal. Also, another significant benefit of the unilateral approach is that the musculature and soft tissue and disc are traumatized on only one side of the back.

The present invention provides a percutaneous surgical disc procedure, comprising the steps of percutaneously entering the back of the patient in a posterolateral direction with an access cannula, advancing said access cannula through a first percutaneously created fenestration of the annulus of the disc, percutaneously entering the back of the patient in a posterolateral direction with an accessory cannula, and advancing said accessory cannula through a second percutaneously created fenestration of the annulus adjacent to and on the same side of the disc as the first fenestration.

The present invention also provides a method for the percutaneous decompression of a herniated intervertebral disc in a human patient, which comprises percutaneously entering the back of the patient in a posterolateral direction with an access cannula, advancing the access cannula into the disc through a first percutaneously created fenestration of the annulus of the disc, percutaneously entering the back of the patient in a posterolateral direction with an accessory cannula, advancing the accessory cannula into the disc through a second percutaneously created fenestration of the annulus adjacent to and on the same side of the disc as the first fenestration, removing nuclear material through one of the cannulae and observing the removal with an endoscope through the other cannula.

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