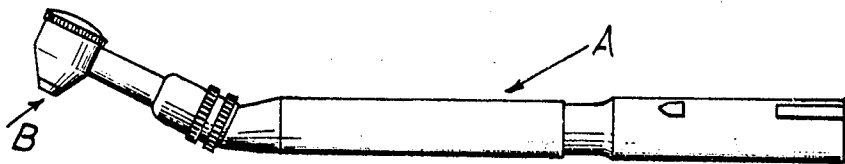


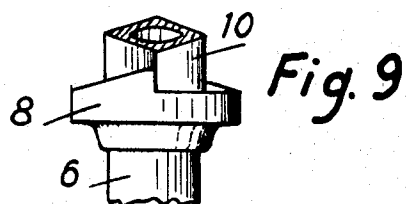
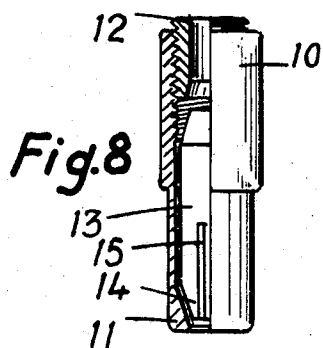
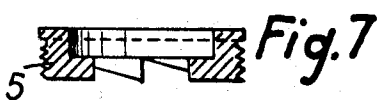
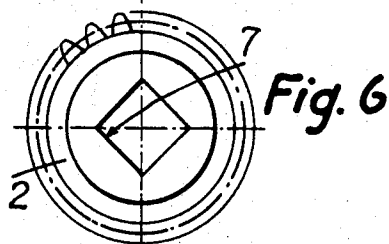
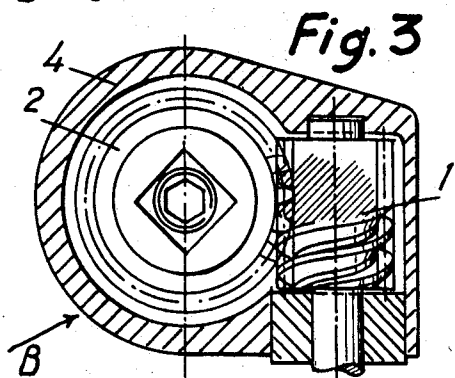
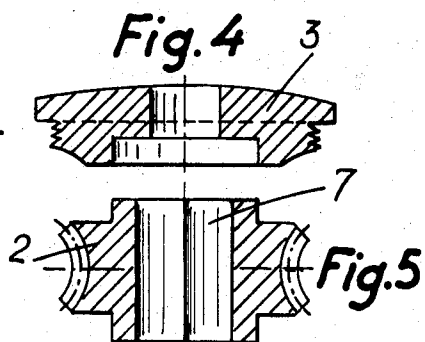
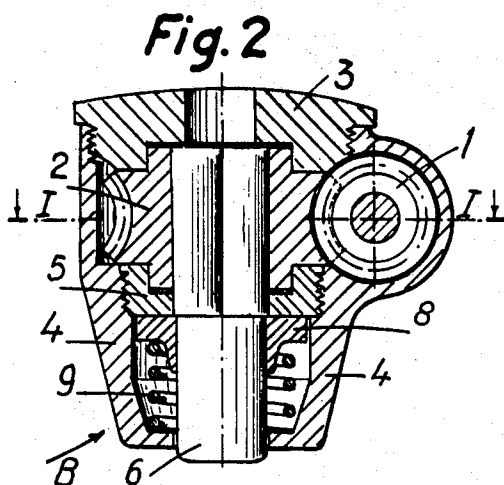
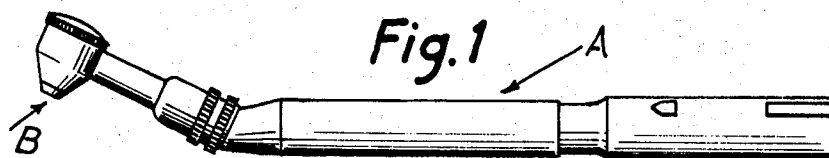
[72] Inventors Americo Colombo;
Ugo Ronchetti, via dei Partigiani 12, Como,
Italy
[21] Appl. No. 788,389
[22] Filed Jan. 2, 1969
[45] Patented May 25, 1971
[32] Priority Jan. 19, 1968
[33] Italy
[31] 3802-A/68

[54] ODONTOLOGICAL INSTRUMENT
1 Claim, 9 Drawing Figs.
[52] U.S. Cl..... 32/27,
32/57
[51] Int. Cl..... A61c 1/10
[50] Field of Search..... 32/54, 27,
26, 57

[56] References Cited
UNITED STATES PATENTS
2,531,680 11/1950 Gustafson..... 32/54
3,368,279 2/1968 Weissman 32/27
FOREIGN PATENTS
450,868 9/1927 Germany..... 32/57
Primary Examiner—Robert Peshock
Attorney—Sandoe, Hopgood & Calimafde

ABSTRACT: An odontological instrument for introduction into and hollowing out the root channels of the teeth, comprising an angled-off longitudinal handle terminating in a head accommodating a worm and worm wheel, fixed and movable cam means, a spring acting upon the movable cam, and a tool carrying shaft which imparts to the tool a screwing movement and a rapid axial retracting movement.





ODONTOLOGICAL INSTRUMENT

This invention relates to an odontological instrument for introduction into the root channels of the teeth to hollow them out.

It is known that for the preservative treatment of the teeth it is sometimes necessary to empty and hollow out the root channel's after the nerve of the tooth has been killed. This hollowing-out operation is carried out manually by making use of small instruments of various forms and requires much time and great care to avoid breaking of the instrument in the root channel.

To facilitate this operation, the invention provides an odontological instrument which comprises an angled-off longitudinal handle terminating in a head for mounting a tool arranged for two main alternating movements, a screwing movement resulting from an axial forward movement and a simultaneous limited rotation, and a rapid axial retracting movement.

A preferred embodiment of the invention will now be described by way of example and with reference to the accompanying drawing, in which:

FIG. 1 is an outside view of an odontological instrument according to the invention, comprising a longitudinal handle means A with a head B;

FIG. 2 is an axial vertical section of the head B on a larger scale;

FIG. 3 is a section taken on the line I-I of FIG. 2;

FIG. 4 is an axial section through a clamping cap for a worm gear in the head B;

FIG. 5 is an axial section through the worm gear;

FIG. 6 is a plan view of the gear of FIG. 5;

FIG. 7 is an axial section through a locking nut for the worm gear, provided with a ratchet toothing;

FIG. 8 is a front elevational view, half in an axial section, of a tool carrying shaft insertable in the head B and arranged for a screwing movement alternating with a rapid return movement, the shaft carrying in its interior a clamping chuck for a tool, and

FIG. 9 is a front view of the movable shaft of FIG. 8, provided with a ratchet toothing corresponding to and cooperating with the ratchet toothing in the locking nut of FIG. 7.

Referring now to the FIGS. and more particularly to FIG. 2, there is shown a worm 1 meshing with a worm gear 2 to impart thereto a perpendicular rotary movement of reduced speed.

The worm gear 2 is held in position by a head cap 3, screwed down into a body 4 of a head B, and by a threaded nut 5 also screwed into the body 4 of the head B, from the other side of the worm gear 2. The nut 5 carries a ratchet toothing on one side and forms a fixed cam to obtain an alternating cyclic spinning and rapid return movement of a tool carrying shaft 6.

As shown in FIGS. 5 and 6, the worm gear 2 is provided with a central through hole 7 of square cross section for receiving the tool carrying shaft 6 arranged for rotation and axial movement.

Keyed to the shaft 6 is a ring 8 provided with ratchet teeth on its front or upper side, as viewed in FIG. 9, and forming the movable cam for producing the axial movement of the tool carrying shaft 6. As shown in FIG. 2, the ring 8 is surrounded

by a spring 9 which serves to produce the rapid return movement of the tool carrying shaft 6 and thereby that of the tool mounted therein.

As shown in FIG. 8, the tool carrying shaft 6 has a cylindrical portion and an adjacent coaxial portion 10 of a square cross section to permit its clamping in the corresponding square hole 7 in the worm gear 2.

A cylindrical bore is provided in the shaft 6 and terminates at one end with a conical surface 11 whereas the other end is provided with a screw thread into which a locking sleeve 12 is screwed.

A clamping chuck 13 having a conical end 14 and longitudinal expansion slots 15 as in the conventional clamping chucks is inserted in the cylindrical bore of the shaft 6 to permit the clamping of the tool therein by screwing down the threaded locking sleeve 12.

The operation of the device is as follows: The worm 1 imparts a rotary movement to the worm gear 2 which has keyed in its square hole the tool carrying shaft 6 in which the tool is secured. So the tool is rotated by the worm 1 and worm gear 2 through the fixed and movable cams, the tool being moved with a slow forward movement and a rapid retraction movement in different cycles.

Obviously the worm and worm gear may be replaced by other known transmission systems, such as conical gears, spur gears, and the like; also the tool carrying shaft may have different polygonal forms instead of being square or may be provided with a splined connection system.

We claim:

1. An odontological instrument for hollowing out the root channels of the teeth, comprising: an angled-off longitudinal handle terminating in a head; chuck means carried by said head for mounting a tool; a drive shaft mounted in said handle; speed reducing means comprising a worm gear fixed to said drive shaft and a pinion gear rigid with said chuck means connecting said drive shaft with said chuck means for imparting rotary movement to said chuck means at a reduced speed; a fixed cam carried by said head; a ratchet cam rigid with said chuck means for cooperation with said fixed cam; and spring means acting on said ratchet cam urging it into engagement with said fixed cam whereby a predetermined plurality of revolutions of said worm gear results in a single revolution of said chuck means and alternate, axial forward and rearward movement is imparted to said chuck means at least once during each revolution of said chuck means, said cams being formed of a pair of inclined, cooperating, similar, steadily rising, annular, cam faces movable relative to each other in a circumferential direction of the chuck means for the odontological instrument and interrupted in at least one position in said circumferential direction by a surface extending axially of said chuck means, said annular cam faces beginning to rise steadily at the axially extending surface and being kept in engagement with each other during their movement relative to each other in said circumferential direction by said spring means so that said chuck means for the odontological instrument will carry out a relatively slow axial forward movement with a simultaneous limited rotary movement as long as said annular cam faces slide on each other, but will carry out a rapid axial retracting movement under the action of said spring means when said axially extending surfaces are aligned.