

[54] ROOT CANAL REVERSIBLE STOP

[76] Inventor: Dennis W. Saffro, 10158 Hollow
Glen Cir., Los Angeles, Calif. 90024
[22] Filed: Sept. 11, 1972
[21] Appl. No.: 287,773

[52] U.S. Cl. 32/57
[51] Int. Cl. A61c 11/00
[58] Field of Search 32/57, 40 R

[56] References Cited
UNITED STATES PATENTS

3,330,040 7/1967 Kahn 32/57
3,388,473 6/1968 Loran 32/57

Primary Examiner—Robert Peshock
Attorney—Allan Rothenberg et al.

[57] ABSTRACT

An endodontic instrument for treating a pulp canal includes an elongated member having a flated cutting portion at one end, a handle at the other and an intermediate part between the cutting portion and the handle. Selected stops of a set of reversible stop members are individually positionable on the intermediate portion in abutment with a lower shoulder of the handle, each of the stop members having a different length so as to adjust the effective length of the cutting portion. Each stop has a small and large stopping end to allow files to be used individually or together on a single tooth, and each stop has an interior rubber holding section penetrated by the cutting portion to hold the stop.

6 Claims, 6 Drawing Figures

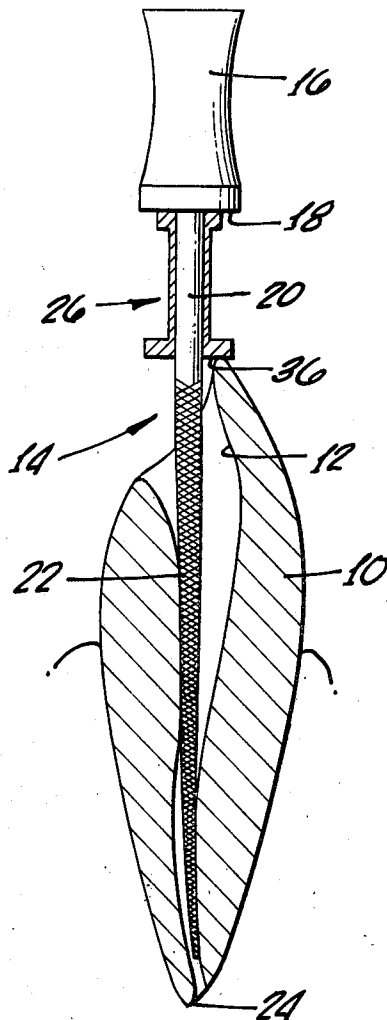


FIG. 1.

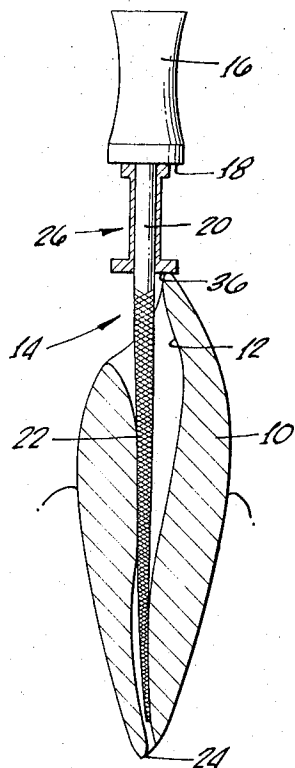


FIG. 2.

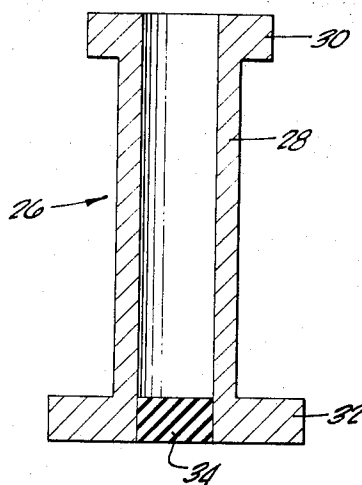


FIG. 3.

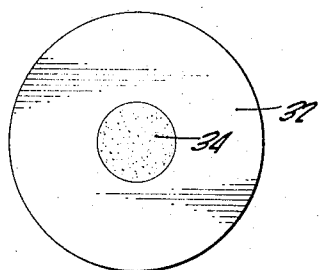


FIG. 4.

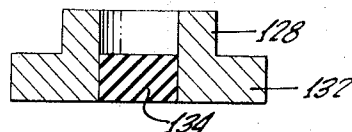


FIG. 6.

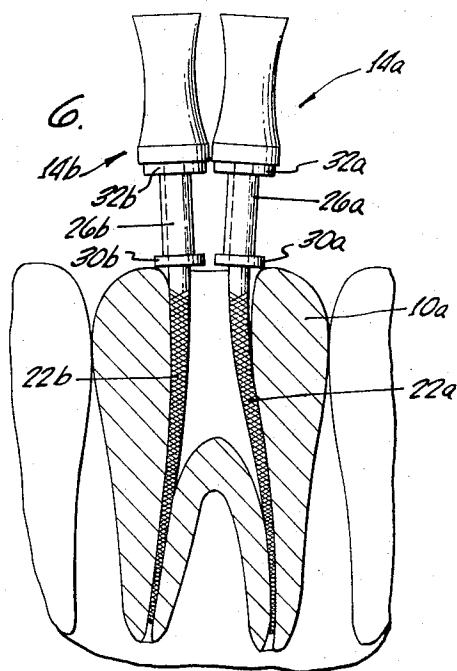


FIG. 5.



ROOT CANAL REVERSIBLE STOP**BACKGROUND OF THE INVENTION****1. Field of the Invention:**

This invention relates to an endodontic instrument for treating root canals, and more particularly concerns a root canal instrument having a reversible stop to effectively control cutting length of the instrument.

2. Description of Prior Art:

In filing or reaming root canals of endodontically involved teeth, it is important to limit the depth of penetration of the file, reamer or other standardized root canal instrument to avoid going beyond the actual length of the tooth and injuring healthy tissue. Pieces of rubber or the like have been used in the past. However, this has not been satisfactory in that it does not allow accurate determination of the depth of the canal, nor does it provide a positive limit of the penetration.

There has also been provided an adjustable device for files and reamers in which the end of the instrument is provided with a transverse bend received in a slot in a handle assembly. By rotation of a nut, the transversely bent portion is caused to shift axially relative to the handle device, thereby varying the length of the fluted cutting portion of the instrument that projects beyond the handle. While offering some advantages, this arrangement is complex, expensive and somewhat difficult to use.

In the U.S. Pat. to Kahn 3,330,040, a stop coil is employed having a threaded hub or ribs for securing the stop member to the file handle. This arrangement is relatively time-consuming in assembly and somewhat complex.

The Siegel U.S. Pat. No. 3,358,826 describes a kit having a number of metallic stop members, in which the kit is arranged to receive each of the stop members to facilitate insertion or assembly of the file on the stop. Position of the stop on the file is determined by a measurement, but there is no assurance that such position might not be changed in use.

In my prior U.S. Pat. No. 3,562,913, I provide a series of spaced abutment means on the file and a slot in a stop to be received and retained by selected shoulders of the file. Although this arrangement provides many advantages, it requires a special configuration of the file and this is not readily adaptable to conventional endodontic instruments.

An endodontic operation may be carried out upon a single root canal. In such a case, it is desirable that the stop have an extensive and broad surface that bears upon the tooth to most properly and positively limit penetration of the file. In some endodontic operations involving multiple canals, more than one root canal file may be used on a single tooth. In such situations, available space may not be sufficient for use of the preferred larger stop surface and such a stop cannot be used.

Accordingly, it is an object of the present invention to provide a simple, inexpensive and readily assembled stop for a root canal file which may be reversed to facilitate use in a different application.

SUMMARY OF THE INVENTION

A set of reversible stops for a root canal instrument has individually different lengths, each having a hollow shank, a small stop flange at one end and a large stop flange at the other end. A rubber holding section is secured to and within the stop to firmly grip the shaft of

a root canal instrument that is inserted through the stop and penetrates the holding section.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an elevational view, partly in section, illustrating the endodontic instrument of this invention as used in treating a root canal;

FIG. 2 is an enlarged elevational section of a preferred form of the stop of this invention;

FIG. 3 is a plan view of the large stopping end of the stop;

FIG. 4 illustrates a modified form of the stop of shorter length;

FIG. 5 illustrates an insert that may be used with or without one of the other stops of this invention; and

FIG. 6 illustrates a pair of root canal instruments and stops of this invention in place during operation on a single tooth.

DESCRIPTION

As illustrated in FIG. 1, a tooth 10 has a root canal 12 into which is to be inserted an appropriate endodontic instrument for the required root canal operation. The instrument shown in FIG. 1 is a root canal file 14 having a handle 16 formed with a lower shoulder 18, an intermediate portion 20 and a fluted or cutting end 22.

In use of the file 14, it is essential that the end of its cutting portion does not penetrate beyond the lower or deeper end 24 of the tooth 10. To prevent such unwanted penetration, various types of stops have been employed, as indicated above. According to the present invention, a simple, inexpensive, readily selectable and precisely positioning stop or series of stops is provided. One stop 26 of such a set is shown in position on the intermediate portion of the endodontic instrument 14 in FIG. 1.

As more particularly shown in the enlarged view of FIG. 2, stop 26 includes a hollow shank 28, a small stop end in the form of a peripherally continuous, radially extending flange 30 and a large stop end in the form of a peripherally continuous, radially extending flange 32. Preferably, the flanges and shank are formed of an integral body of metal or plastic that is readily sterilized, although the entire stop may be disposable if desired.

Securely fixed to the inside of the hollow stop shank, as by bonding, adhesive or the like, is a rubber web or holding section 34 that extends across the interior of the stop. The web or holding section 34 is formed of a material and in a thickness that is readily penetrated by the shaft of the endodontic instrument and which has sufficient resilience when so penetrated to firmly grasp the shaft of the instrument. Web 24, shown in FIGS. 1 and 2 as positioned at the larger stop end of the stop, may be positioned alternatively at any location along the length of the stop as deemed necessary or desirable.

The shank 28 has an inner diameter substantially equal to or slightly greater than the outside diameter of the larger root canal files that are currently standardized and used today at about 1.5 millimeters. The shank will have a length for the different stops of a set from 1 millimeter to 8 millimeters. Thus, a set of stops will include eight different stops substantially identical to that shown in FIG. 2, differing only in the length of the shank portion. The difference in length of shank portion is one millimeter from one stop to the next in a series. The length as measured axially of the stop of each of the flanges 30 and 32 is preferably 1 millimeter,

wherefor a maximum size stop of the set has a total length of 10 millimeters. It will be readily appreciated that other sizes may be employed as deemed necessary or desirable, and the specific dimensions set forth herein are stated solely for purposes of exposition and not by way of limitation.

In use of the stop of FIGS. 1 and 2, after selecting a stop of desired length, the shaft of the endodontic instrument is inserted first into the small stop end, then through the rubber web 34 to pierce this. The entire stop is slid along the instrument shaft until the small stop end firmly and fully engages the shoulder 18 of the handle. Now, the lower surface of the large stop end is positioned at a known distance from the free end of the instrument shaft, and, further, such distance cannot be increased. Thus, the instrument cannot penetrate beyond the deep end of the tooth because the large stop end 32 firmly bears upon the upper surface 36 of the tooth.

In work performed upon a single root canal, it is preferable to employ the large stop end for abutment against the tooth so as to ensure that the stop will always engage the tooth and limit penetration of the instrument as the latter is manipulated during the operation. Nevertheless, for endodontic operations involving multiple canals and use of more than one root canal file on a single tooth, a large area of stop surface cannot be employed. In such a situation, as shown in FIG. 6, each of a pair of stops 26a and 26b is placed on the shaft of a respective one of a pair of root canal instruments 14a and 14b with the larger stop ends 32a and 32b in contact with the shoulders of the instrument handles and with the smaller stop ends 30a and 30b positioned to abut the upper surface of the tooth. When both of the instrument shafts are inserted in respective root canals of the tooth 10a of FIG. 6, the instrument shafts are positioned close to one another at the upper surface of the tooth so that there is space only for the relatively small stop ends 30a and 30b. The large stop ends 32a and 32b are substantially coextensive in transverse dimension with the instrument handles and thus introduce little or no additional restriction on position or manipulation of the instrument.

As described above, a set of eight stops of the type shown in FIG. 2 will provide a total stop length of a minimum of 3 millimeters and a maximum of 10 millimeters. A stop of 2 millimeters in length is shown in FIG. 4 as comprising a flange 132 that forms the large stop end. Its shank 128 itself also forms the small stop end. A resilient web 134 is firmly bonded to the hollow interior of the stop of FIG. 4 to be penetrated by and to firmly grasp the instrument shaft as described in connection with the previously described stop. The stop of FIG. 4, having a large stopping flange 132 of 1 millimeter in length and a combined shaft and small stopping end also of 1 millimeter in length, has a total length of 2 millimeters.

A 1 millimeter stop employing principles of the present invention is shown in FIG. 5 and comprises a single stop flange or, in effect, apertured disc 232 having a length of 1 millimeter and a diameter preferably equal to the diameter of the large stop flange 32 or 132. Resilient rubber holding section or web 234 is bonded to the aperture of the stop disc 232 to be pierced by and to firmly grasp the shank of the endodontic instrument in the manner previously described.

The stops form a set of consecutive lengths. Each stop differs in length from an adjacent stop of the set by a predetermined distance, which distance in this example is 1 millimeter. Thus, the several stop lengths are available in increments of 1 millimeter. If an increment of less than 1 millimeter is desired, it is provided by an additional stop (not shown) that is formed substantially identical to the stop shown in FIG. 5 but has a length of less than one millimeter, such as a length of one-half millimeter, for example. Such one-half millimeter insert or intermediate stop may be made either with or without the rubber holding web. When made without the rubber holding web, the insert is used together with another one of the stops illustrated and disclosed herein and is positioned between such other stops and the handle of the endodontic instrument.

For purposes of exposition, but not by way of limitation, each of the stop flanges 30 and 32 may be made 1 millimeter in length, the small stop flange 30 having a diameter of 3 millimeters and the large stop flange 32 having a diameter of 5 millimeters. For accommodation of large-diameter standardized instruments, the internal diameter of the shank is one and one-half millimeters, as previously mentioned. Accordingly, the wall thickness of the shank 28 is approximately one-half millimeter. It will be understood, however, that the wall thickness of the shank is not critical and that this wall may be made with a thickness up to an amount sufficient to provide a shank outer diameter equal to but not greater than the diameter of the small stop end 30.

The length of the reversible stop employed depends upon the length of the root canal file and the tooth to be involved in the operation. If the file is a standard 25 millimeters in length and the tooth is twenty and one-half millimeters long, as may be determined by X-ray, a stop having a total length of 5 millimeters may be employed. With this length of stop, the free end of the file is prevented from penetrating beyond a point one-half millimeter from the deepest end or apex of the tooth. Where the tooth is more than 10 millimeters shorter than the file, the 10-millimeter stop is used together with an additional stop that is necessary to achieve the desired effective working length of the instrument. When a stop of one-half millimeter, or odd multiples thereof, is required, the one-half-millimeter disc will be employed alone or together with another stop of a suitable length. For example, if the tooth is 19 millimeters long and the root canal file is 25 millimeters long, a pair of stops, one of 5 millimeters and one of one-half millimeter, would be employed to keep the free end of the instrument one-half millimeter from the apex of the tooth. File length, of course, is the distance between the tip of the cutting end and handle shoulder 18.

It will be seen that there has been provided a set of reversible stops readily employed with standardized root canal instruments, including files, reamers, broaches, drills and the like, which is simple in construction, readily employed and exceedingly reliable in operation.

The foregoing detailed description is to be clearly understood as given by way of illustration and example only, the spirit and scope of this invention being limited solely by the appended claims.

I claim:

1. A root canal file and reversible stop comprising
 - A. an elongated member,

5

1. one end portion of said elongated member having cutting means thereon,
2. a handle fixed at the opposite end of said elongated member, and
3. an intermediate file portion between said cutting means and said handle,
 - a. said handle having a shoulder adjacent said intermediate file portion, and
- B. a reversible stop member on said intermediate portion, said stop member comprising
 1. an elongated hollow shank having an internal diameter substantially equal to the external diameter of said intermediate file portion,
 2. a small stopping end comprising a peripherally continuous flange extending radially outwardly from one end of said shank and formed integrally therewith,
 - a. said last-mentioned flange having a diameter greater than the diameter of said first-mentioned flange, and
 4. a resilient holding section secured to and within said shank and extending entirely across the interior of said shank,
 - a. said intermediate file portion piercing said holding section and being snugly grasped thereby,
 - b. one of said stopping end flanges being in close abutment with the shoulder of said handle, whereby the other of said stopping end flanges provides a stop surface precisely positioned at a known distance from the cutting end portion of said file,
5. said stop member being reversibly positioned on said intermediate file portion so that in a first position said small stopping end engages said handle shoulder and said large stopping end is adapted to engage the crown of a tooth to limit depth of penetration of said cutting means in the root canal of said tooth, and when said stop member is in a reversed position said large stopping end engages said handle shoulder and said small stopping end is adapted to engage the

6

crown of a tooth and provide adequate space for simultaneous engagement of said crown by the small stopping end of a second similar file and stop member.

2. The root canal file of claim 1 wherein said smaller diameter stopping end flange is in abutment with the shoulder of said handle and said larger diameter stopping end flange provides a precisely positioned stop of said file.

3. The root canal file of claim 1 wherein said larger diameter stopping end flange is in abutment with the shoulder of said handle and said smaller diameter stopping end flange provides a precisely positioned stop of said file, whereby a plurality of files may be used together on a single tooth with said smaller stopping end flanges each providing a stop for its corresponding file without interfering with one another.

4. The instrument of claim 1 wherein said holding section comprises a continuous rubber web bonded to the inside of said hollow shank.

5. The root canal of claim 1 including a second stop member interchangeable with said first stop member, said second stop member being substantially identical with said first stop member but having a length that differs from said first stop member by a predetermined amount.

6. The root canal file of claim 5 including a plurality of additional stop members each identical to said first-mentioned stop members but each having a unique length that differs from the length of another stop member by a predetermined distance, and further including an insert on said intermediate file portion interposed between said handle shoulder and that end of a stop member on said file that is adjacent said shoulder, said insert having a thickness that is less than said predetermined distance, whereby a stopping length is provided at a distance between the stopping length afforded by two of said stop members having consecutive lengths in the set of lengths of said plurality of stop members.

* * * * *

45

50

55

60

65

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,781,996 Dated January 1, 1974

Inventor(s) Dennis W. Saffro

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the claims, in Column 5, after line 17 and before line 18, insert the following phrase: --3. a large stopping end comprising a peripherally continuous flange extending radially outwardly from the other end of said shank and integral therewith, --.

Signed and sealed this 26th day of November 1974.

(SEAL)
Attest:

McCOY M. GIBSON JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents