

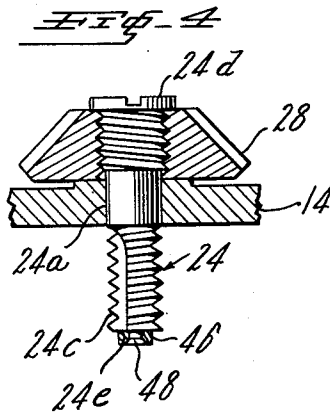
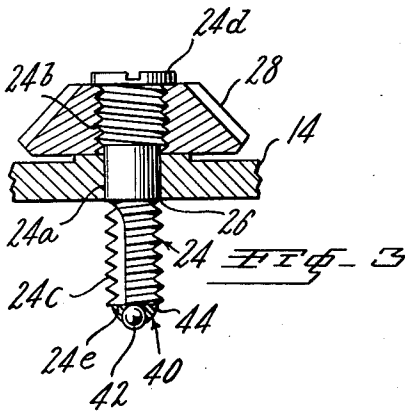
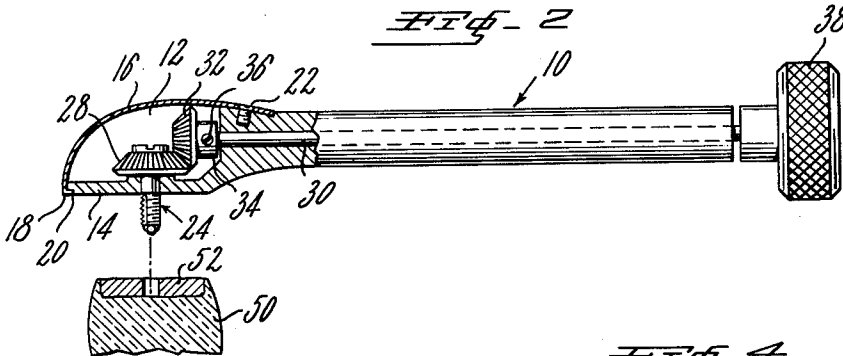
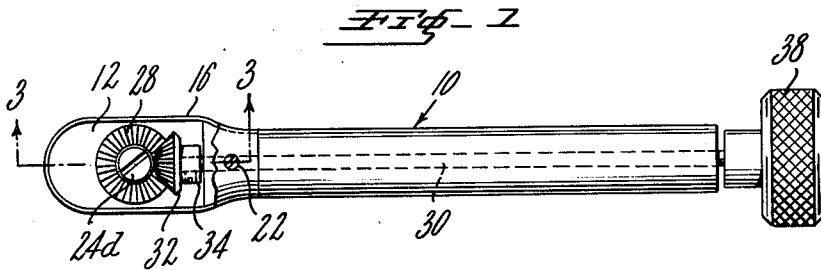
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INLAY EXTRACTOR

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INLAY EXTRACTOR

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The present invention relates to dental equipment, and more particularly to an extractor for removing restorations from teeth.

In the dentistry field, it often becomes necessary to remove an inlay or the like from a tooth for the purposes of replacement or repair, and/or to facilitate treatment of the inlay-supporting tooth. This removal must be effected in a manner minimizing destruction or distortion of the restoration or damage to the tooth, and consistent with the requirement of ease of manipulation, accessibility to innermost parts of the mouth, and operability from without the mouth of the patient.

Accordingly, it is an object of the present invention to provide an inlay extractor which incorporates some or all of the aforesaid advantageous features.

It is another object of the present invention to provide a restoration remover operable from without the mouth to lift an inlay or the like from a tooth located in a relatively remote part of the mouth.

It is a further object of the present invention to provide a restoration remover of the aforesaid character which does not destroy the usefulness of the inlay or fracture the tooth to which the inlay is bonded.

Yet, a further object of the invention is the provision of an inlay remover of the type suitable for jacking or lifting a restoration from a tooth by direct engagement therewith, yet particularly constructed to reduce the risk of damaging the tooth due to a grinding frictional contact with the tooth.

The above and still further objects and advantages of the present invention will be best understood by reference to the following detailed description of an illustrative embodiment, when taken in conjunction with the drawings, wherein:

Fig. 1 is a top plan view with parts broken away and sectioned of an inlay extractor embodying features of the present invention;

Fig. 2 is a side elevational view, with parts broken away and sectioned, of the extractor of Fig. 1;

Fig. 3 is an enlarged fragmentary sectional view taken substantially along line 3—3 of Fig. 1; and

Fig. 4 is an enlarged fragmentary sectional view similar to Fig. 3 and showing a modification within the contemplation of the present invention.

Referring now more particularly to the drawing there is shown an inlay extractor particu-

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larly suitable for obtaining access to the most remote parts of the mouth for removing restorations, yet being readily operable exteriorly of the mouth. Specifically the extractor embodies an elongated support 10 provided adjacent one end thereof with a housing 12 including a bottom wall 14 and a removable dome-like cover 16. The cover is formed adjacent its forward end with an intumed retaining flange 18 received within a complementary notch 20 in the bottom wall 14, the cover being held in place by a screw 22 threaded into the support 10.

A self-tapping jack member 24 is arranged transversely of bottom wall 14 and supported intermediate its end for axial rotation. As seen in Fig. 3, the jack member 24 includes a bearing part 24a rotatably journaled within a complementary bore 26 formed in the bottom wall 14; a supporting part 24b threadedly engaging a driven gear 28 forming part of a lateral drive for the self-tapping jack member 24; a longitudinally undercut threaded inlay-engaging part 24c depending from the bottom wall 14 of housing 12; and, an abutment part or slotted head 24d overlying the driven gear 28. The threading on the supporting part 24b is in a direction opposite to the threading on the inlay-engaging part 24c whereby, upon axial rotation of the self-tapping jack member 24 in a direction to drive the depending inlay-engaging part 24c into a restoration, the driven gear 28 rides free on the bottom wall 14 of the support 10.

The lateral drive for the self-tapping jack member 24 embodies an elongated drive shaft 30 journaled longitudinally of the support 10 and having one end projecting into the housing 12 and supporting thereon a drive beveled gear 32, meshing with the driven beveled gear 28. The drive gear 32 is formed with an integral supporting collar 34 surrounding the adjacent end of the shaft 30 and secured thereto by means of a set screw 36. A suitable operating element, such as the knurled knob is fixed to the end of the shaft 30 remote from the housing part 16.

In order to minimize damage of the tooth proper due to grinding frictional contact between the self-tapping jack member 24 which directly abuts the tooth, a substantially stationary bearing contact 40 is formed on the leading end 24e of the self-tapping jack member 24. One particularly suitable construction is a point contact such as illustrated in Fig. 3, which includes a ball 42 universally mounted within a retaining member 44. Another structure which may be advantageous for this purpose is the area contact

shown in Fig. 4 which includes a disk-like member 46 journaled coaxially of the jack member 24 by means of a depending pin 48 suitably counter-sunk into the disk-like member 46.

Briefly, the inlay extractor is employed in the following manner for effecting removal of restorations in a manner minimizing damage to a tooth proper, such as the one designated by numeral 50, and the restoration 52 bonded thereto. A lead hole of a specified size is drilled into the restoration 52 whereupon the longitudinally undercut threaded inlay-engaging part 24c of the self-tapping jack member 24 is placed into the drilled hole. Thereupon the knob 38, accessible exteriorly of the mouth due to the provision of the lateral drive, may be grasped and rotated in a direction to cause the part 24c to enter the drilled hole and ultimately bring either the point contact of Fig. 3 or the area contact of Fig. 4 into direct abutment with the underlying portion of the tooth 50. Continued rotation will result in a jacking action effecting a lifting of the restoration 52 from the tooth. When the inlay is completely lifted from the tooth the extractor is withdrawn from the mouth and the inlay can then be removed from the jack member.

It is to be expressly understood that the proper sized jack members may be employed when necessary to lift smaller or larger restorations. For this purpose and in order to replace broken or worn jack members, the cover 16 can be disengaged from the support proper by removing screw 22, whereupon the slotted head 24d of the jack member is rendered accessible. Upon engaging this slotted head with a screw driver or the like the jack member may be removed for inspection, repair or replacement.

From the foregoing it is apparent that the inlay extractor of the present invention may be employed to remove restorations without substantially impairing the usefulness of the inlay and/or damaging the tooth. Further, the device is compact permitting it to be brought into various locations within the mouth for operation exteriorly of the mouth. The positive drive and interchangeability of the jack members render the device exceptionally useful in the practice of dentistry where reliability and simplicity are essential.

While in accordance with the provisions of the statutes, I have illustrated and described the best form of embodiment of my invention now known to me, it will be apparent to those skilled in the art that changes may be made in the form of the apparatus disclosed without departing from the spirit of my invention as set forth in the appended claims and that in some cases certain features of my invention may be used to advantage without a corresponding use of other features.

What I claim is:

1. An inlay extractor comprising an elongated support, a self-tapping jack member arranged transversely of one end of said support and journaled thereon, a shaft extending longitudinally of said support and rotatably supported thereon, coupling means for drivingly connecting said shaft to said self-tapping jack member, manually operable means carried exteriorly of the other end of said support and operatively connected to said shaft for rotating said shaft, and bearing means on said self-tapping jack member for forming a substantially stationary contact with the tooth underlying the inlay to be extracted.

2. An inlay extractor according to claim 1, wherein said bearing means includes a ball

mounted within a seat provided on the free-end of said self-tapping jack member and forming a point contact with the tooth.

3. An inlay extractor according to claim 1, wherein said bearing means includes a disk-like member rotatably supported coaxially of said self-tapping jack member and forming an area contact with the tooth.

4. An inlay extractor comprising an elongated support formed adjacent one end with a housing having a bottom wall, a self-tapping jack member arranged transversely of said bottom wall and supported intermediate its ends for axial rotation, a shaft journaled longitudinally of said support having one end projecting into said housing and having the other end terminating adjacent the other end of said housing, gearing in said housing interconnecting said one end of said shaft and the adjacent end of said self-tapping jack member, an operating member connected to said other end of said shaft for driving said shaft to cause axial rotation of said self-tapping jack member, and bearing means seated on the other end of said self-tapping jack member for forming a substantially non-rotatable contact with the tooth underlying the inlay to be removed.

5. An inlay extractor comprising an elongated support formed adjacent one end with a housing having a bottom wall, a gear within said housing resting upon said bottom wall, a self-tapping jack member including a supporting part threadedly engaging said gear and a bearing part rotatably journaling said jack member on said bottom wall for axial rotation, said jack member further including a threaded inlay-engaging part depending from said bottom wall and an abutment overlying said gear, and a lateral drive for said self-tapping jack member coupled to said gear for effecting axial rotation of said jack member, the threading on said support part being opposite to the threading on said inlay-engaging part whereby upon axial rotation of said jack member in a direction to drive said inlay-engaging part into said inlay, said gear rides freely on said bottom wall of said support.

6. An inlay extractor comprising an elongated support formed adjacent one end with a housing having a bottom wall, a gear within said housing resting upon said bottom wall, a self-tapping jack member including a supporting part threadedly engaging said gear and a bearing part rotatably journaling said jack member on said bottom wall for axial rotation, said jack member further including a threaded inlay-engaging part depending from said bottom wall and an abutment overlying said gear, a lateral drive for said self-tapping jack member coupled to said gear for effecting axial rotation of said jack member, the threading on said support part being opposite to the threading on said inlay-engaging part whereby upon axial rotation of said jack member in a direction to drive said inlay-engaging part into said inlay, said gear rides freely on said bottom wall of said support, and means on said jack member for forming a substantially non-rotatable contact with the tooth underlying the inlay to be extracted.

7. An inlay extractor comprising a support formed with a seat, a gear resting on said seat, a removable self-tapping jack member threaded through said gear and journaled on said support for axial rotation, said self-tapping jack member including a threaded inlay-engaging part extending from said support and an abutment overlying and bearing against said gear, and a

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lateral drive for said self-tapping jack member coupled to said gear for effecting axial rotation of said jack member.

8. An inlay extractor comprising a support formed with a seat, a gear resting on said seat, a removable self-tapping jack member threaded through said gear and journaled on said support for axial rotation, said self-tapping jack member including a threaded inlay-engaging part extending from said support and an abutment overlying and bearing against said gear, and a lateral drive for said self-tapping jack member coupled to said gear for effecting axial rotation of said jack member, the threaded connection between said

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self-tapping jack member and said gear being opposite to the threading on said inlay-engaging part whereby upon axial rotation of said jack member in a direction to drive said inlay engaging part, said gear rides freely on said seat.

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