(No Model.)

D. GENESE.

DENTAL DRILL.

No. 467,799. Patented Jan. 26, 1892.

Fig. 1.

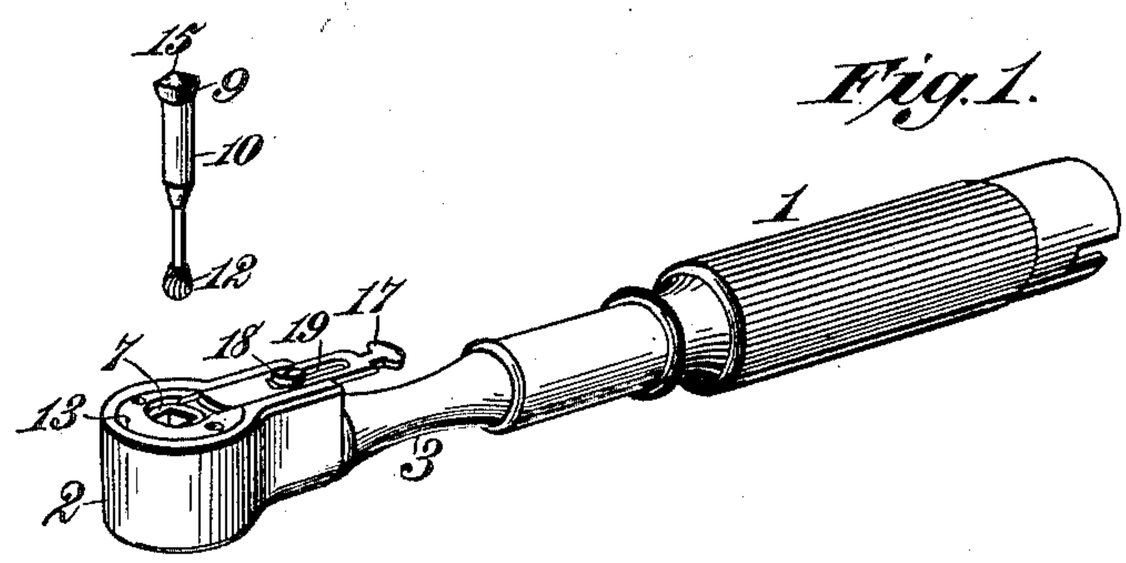


Fig. 2.

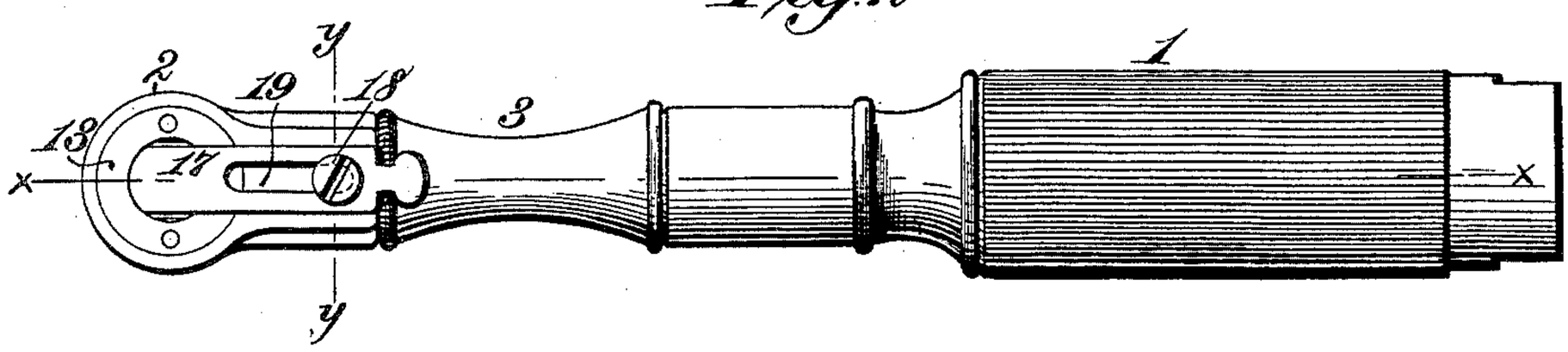


Fig. 3.

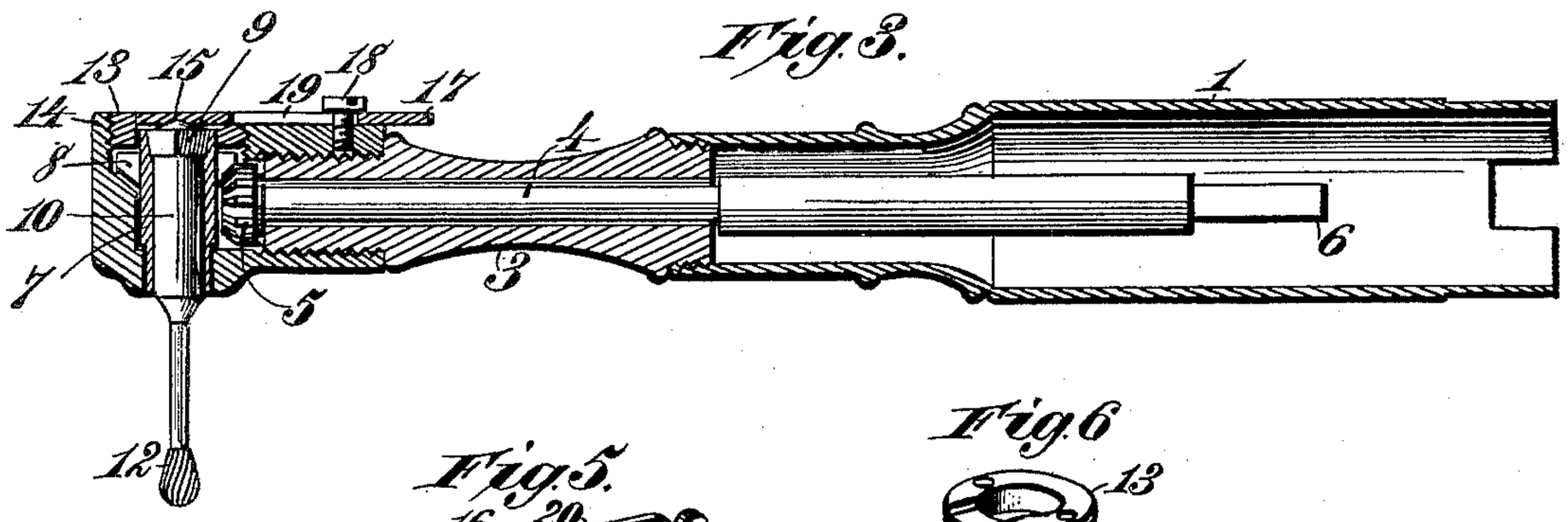


Fig. 5.

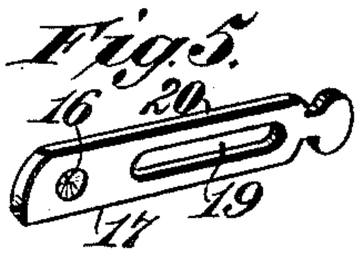


Fig. 6

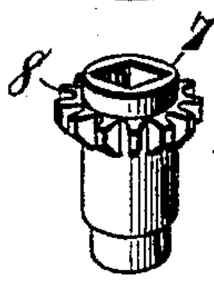


Fig. 7.

Fig. 4.

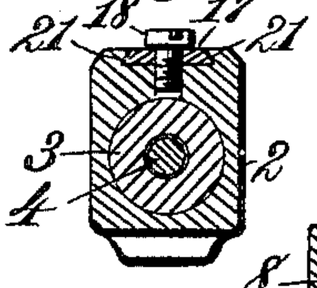


Fig. 9.

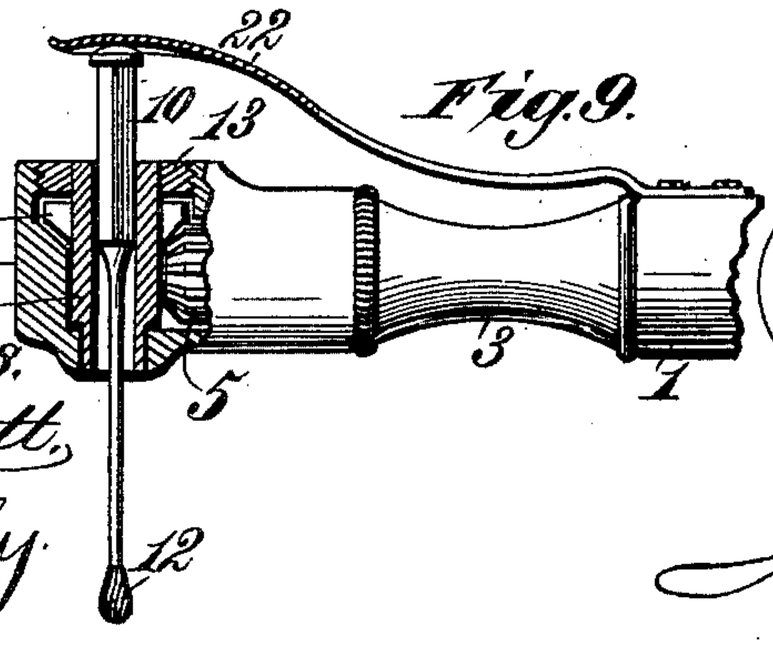
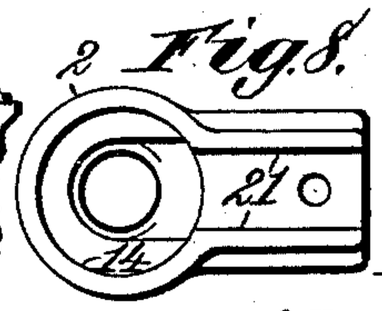


Fig. 8.



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UNITED STATES PATENT OFFICE.

DAVID GENESE, OF BALTIMORE, MARYLAND.

DENTAL DRILL.

SPECIFICATION forming part of Letters Patent No. 467,799, dated January 26, 1892.

Application filed June 3, 1891. Serial No. 394,958. (No model.)

To all whom it may concern:

Be it known that I, DAVID GENESE, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented new and useful Improvements in Dental Drills, of which the following is a specification.

In those dental drills where the burr or tool is rotated in a plane at right angles to the axis of the drive-shaft in the drill-handle the shank of the burr or tool is usually cylindrical and is inserted from the lower end of the drill-head into engagement with a sliding or otherwise movable catch. In such prior constructions the catch is liable to be unintentionally or accidentally moved to release the burr or tool, and consequently the latter becomes detached, which is very objectionable, and, moreover, exceedingly dangerous, if it occurs while operating on a patient, in that the burr or tool is liable to enter the throat of the patient. In prior constructions an objection also resides in the expensive and complicated devices necessary to compel rotation of the burr or tool if it strikes a hard portion of the dentine, and not infrequently the burr or tool in some dental drills stands immovable if it meets a hard resisting portion of the dentine, enamel, or filling.

The objects of my invention are to avoid the objections stated; to provide novel means whereby it is impossible for the burr or tool to become accidentally detached and fall in the mouth of the patient; to provide novel, simple, economical, and efficient means for compelling the burr or tool to properly rotate under all circumstances, notwithstanding resistance offered by the dentine, and to provide novel means whereby the burr or tool will automatically advance during the drilling operation for enabling longer burrs or tools to be employed when those of ordinary length are insufficient to reach the desired point.

To accomplish all these objects my invention involves the features of construction and the combination or arrangement of devices hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a detail perspective view of my improved drill, showing the burr or tool separated therefrom. Fig. 2 is a top plan view on an enlarged scale, showing the position of the parts when the burr or tool is in place. Fig. 3 is a longitudinal central sectional view taken on the line $x\,x$, Fig. 2. Fig. 4 is a transverse sectional view taken on the line $y\,y$, Fig. 2. Fig. 5 is a detail perspective view of the slide for retaining the burr or tool in the rotary tool-socket. Fig. 6 is a detail perspective view of the screw-plug for retaining the tool-socket in the drill-head. Fig. 7 is a detail perspective view of the tool-socket and its bevel-gear. Fig. 8 is a detail top plan view of the drill-head, and Fig. 9 is a detail sectional elevation of a modified construction.

In order to enable those skilled in the art to make and use my invention, I will now describe the same in detail, referring to the drawings, wherein—

The numeral 1 indicates the hollow or tubular drill-handle, and 2 the drill-head, preferably connected with the drill-handle through the medium of a shank 3, having screw-threaded extremities which engage screw-threaded sockets in the drill handle and head. The shaft is provided with an axial bore to constitute the bearing for the drive-shaft 4, which is provided at its outer extremity with a bevel-pinion 5 and at its inner extremity with an angular or other suitably-constructed portion 6 for engaging the usual flexible shaft of a dental engine in such manner that when the latter is operated the drive-shaft 4 will be rapidly revolved.

The drill-head is formed with a cylindrical orifice extending therethrough in a direction at right angles to the axis of rotation of the drive-shaft 4, and this orifice is open at the upper and lower ends of the drill-head, whereby the burr or tool can be introduced through the upper or outer end of the drill-head, as will more fully hereinafter appear. The orifice through the drill-head is so constructed as to constitute a bearing for the cylindrical tool-socket 7, which is made in the form of a short tube having an internal bore square or otherwise angular in cross-section. The uppermost end portion of the tool-socket is formed or otherwise provided with a bevel-pinion 8, meshing into the bevel-pinion 5 of the drive-shaft 4. The lower extremity of the tool-socket is reduced in diameter to ac-

curately fit a correspondingly-reduced portion of the orifice through the drill-head for the purpose of securing a steady and uniform bearing and obtaining accurate and steady rotation of the tool-socket. The uppermost end portion of the square or otherwise angular bore in the tool-socket is laterally enlarged for the purpose of receiving and fitting the laterally-enlarged head 9 of the square or angular shank 10 of the burr or tool 12, whereby the latter can be inserted into position through the upper end of the drill-head until the laterally-enlarged head 9 is properly seated in the laterally-enlarged upper extremity of the square or angular bore in the tool-socket. The tool-socket is retained in proper position within the drill-head through the medium of a screw disk or plug 13 entering and engaging with a screw-threaded socket 14 in the upper end of the drill-head, the construction being such that a portion of the tool-socket enters the orifice in the disk or plug and is supported thereby. The outer surface of the enlarged head 9 is, as here shown, formed with a conical projection 15 adapted to engage a conical recess 16 in one extremity of a slide-plate 17, which is movable rectilinearly on the drill-head for the purpose of engaging the conical recess with the conical projection after the burr or tool has been introduced, as hereinbefore explained. The retaining-plate 17 may be made to move otherwise than in a rectilinear pathway; but the construction shown will be found satisfactory and efficient in use.

To prevent detachment of the retaining-plate 17 and enable it to slide as stated, I provide the drill-head with a set screw or stud 18 passing through a longitudinal slot 19 in the retaining-plate, so that the latter is limited in its sliding movements and is held against displacement. The opposite longitudinal edges of the retaining-plate are beveled, as at 20, and engage undercut edges 21 of its seat in the drill-head, as in Fig. 4, for the purpose of obtaining smooth and accurate movements of the plate in engaging it with and disengaging it from the conical projection on the head of the burr or tool. In some instances the usual burr or tool is insufficient in length to reach from the exterior of the tooth to the point desired, and to fulfill the conditions required for reaching any desired point I employ the construction exhibited by Fig. 9, where it will be observed that the burr or tool 12 is movable lengthwise in the rotary tool-socket 7. The burr or tool in this construction is also provided with a square or otherwise angular shank 10 and a laterally-enlarged head 9, which is acted upon by the free extremity of a highly-tempered leaf-spring 22, attached at its opposite extremity to the drill-handle in any suitable manner. By this construction as the drilling of the tooth progresses the burr or tool will be automatically fed or advanced through the medium of the spring-pressure exerted by the leaf spring 22, while at the same this spring prevents outward displacement of the burr or tool and retains the latter in proper working connection with the rotary tool-socket.

By my improved construction the burr or tool is inserted from the upper or outer end of the drill-head, and the laterally-enlarged head 9 of the burr or tool effectually prevents the passage of the latter entirely through the drill-head, for obviously when the enlarged head 9 strikes the tool-socket the burr or tool will be prevented from passing through the drill-head. This is a very important feature of my invention, in that it effectually avoids all liability of the burr or tool becoming detached and falling into the mouth of the patient being operated upon. In addition to this the angular construction of the burr or tool shank and its engagement with the angular orifice in the tool-socket compels the burr or tool to revolve under all circumstances, notwithstanding the resistance offered by the dentine, enamel, or filling.

By my improved construction and arrangement the presence of a conical projecting sheath at the lower end of the drill-head is avoided, the instrument is rendered more simple and economical, and the drilling of teeth is materially facilitated by reason of the convenience by which the drill is handled and the burrs or tools adjusted or interchanged.

In the example illustrated by the drawings the parts are so arranged that the burr or tool is rotated in a plane at right angles to the axis of rotation of the drive-shaft in the drill-handle; but I do not confine myself to this precise construction, for obviously the bevel-gears could be so arranged that the burr or tool could be revolved in a different plane relatively to the axis of the drive-shaft.

Having thus described my invention, what I claim is—

1. The combination, with the handle and drive-shaft of a dental drill, of a drill-head having an orifice extending therethrough, a rotary tool-socket actuated by the drive-shaft and open at its opposite extremities, a burr or tool having an angular portion to engage the tool-socket and provided at its upper end with a laterally-enlarged head, which prevents the passage of the tool entirely through the tool-socket, and a device engaging the enlarged head of the tool to retain the latter in the tool-socket, substantially as described.

2. The combination, with the handle and drive-shaft of a dental drill, of a drill-head provided with an orifice extending therethrough and open at its upper and lower ends, a rotary tool-socket consisting of a tube having a bevel-pinion and an angular portion extending therethrough and open at its opposite extremities, the bevel-pinion on the drive-shaft meshing with the bevel-pinion of the tube, a removable and replaceable disk or plug engaged with the upper end of the drill-head for retaining the tool-socket in

proper position, a burr or tool having an angular shank engaging the angular portion of the tool-socket and provided at its upper end with a laterally-enlarged head, which prevents the passage of the tool entirely through the tool-socket, and a device engaging the head of the tool to retain the latter in the tool-socket, substantially as described.

3. The combination, with the handle and drive-shaft of a dental drill, of a drill-head open at its upper and lower ends, a rotary tool-socket driven by the drive-shaft and open at its opposite extremities, the burr or tool having an angular shank engaging an angular portion in the tool-socket and provided at its upper end with the enlarged head to prevent the passage of the tool entirely through the tool-socket, and a spring acting upon the burr or tool to automatically feed or advance it during the drilling operation, substantially as described.

In testimony whereof I have hereunto set my hand and affixed my seal in presence of two subscribing witnesses.

DAVID GENESE. [L. S.]

Witnesses:

G. ERNST REARDON,

R. E. HALLY.