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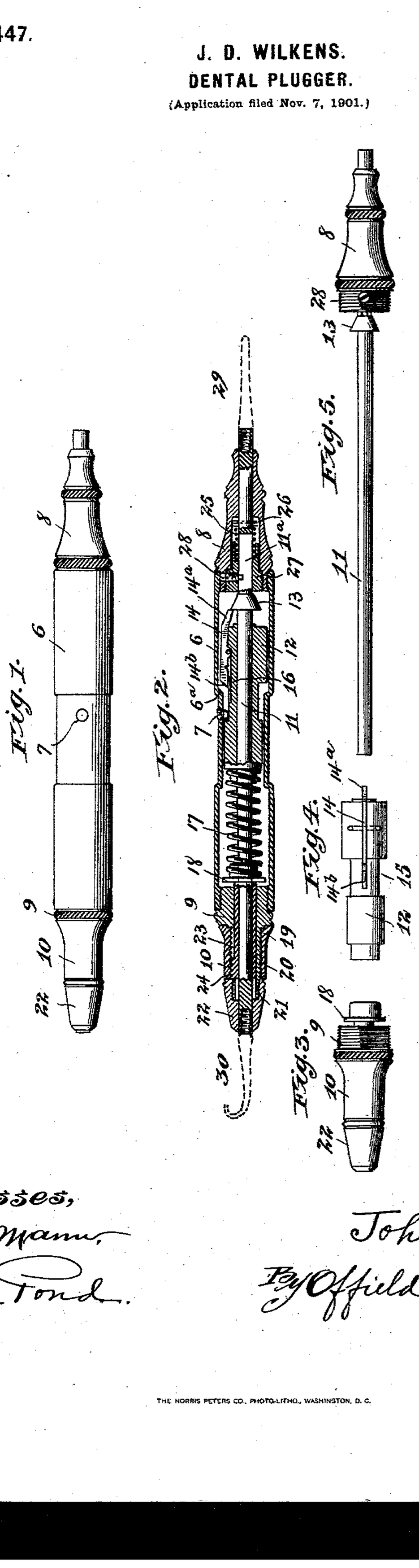
DENTAL PLUGGER.

(Application filed Nov. 7, 1901.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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DENTAL PLUGGER.

SPECIFICATION forming part of Letters Patent No. 715,447, dated December 9, 1902.

Application filed November 7, 1901. Serial No. 81,376. (No model.)

To all whom it may concern:

Be it known that I, JOHN D. WILKENS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Dental Pluggers, of which the following is a specification.

My invention relates to that class of tools used by dental operators commonly known as "pluggers." Tools of this character have heretofore commonly been constructed of an outer cylindrical sheath or casing, an inner spindle extending into and longitudinally movable relatively to the sheath or casing and adapted to receive the hammer proper, a spring located within the casing and adapted to be either compressed or distended by the longitudinal movement of the casing relatively to the spindle, and tripping mechanism whereby the stored energy of the spring may be suddenly and sharply imparted to the tool-holding spindle, the shock being thereby transmitted through the tool to the material operated upon.

The object of my invention is to provide an improved tool of this nature which shall be characterized by simplicity of construction, fineness of operating parts, reliability of operation, and ease of adjustment to vary the power of the spring which supplies the impact, and in which the parts may be separated and assembled for purposes of repair or renewal with the greatest facility.

Another object of the invention is to provide a double-ended tool—that is, one which is adapted to receive a packing or impacting instrument at each end thereof—the tool being operated at one end thereof by means of a push or thrust and at the other end by means of a pull.

With these objects in view my invention consists, primarily, in an improved hammer-tripping mechanism and spring-adjusting mechanism, substantially as hereinafter described, and defined in the claims.

My invention in its preferred form is illustrated in the accompanying drawings, in which—

Figure 1 is an external view of the device as it appears with its parts assembled. Fig. 2 is a central longitudinal sectional view of the same, taken in a plane at right angles to the position of the device as shown in Fig. 1. Fig. 3 is a detail view of the spring-adjusting sleeve and its immediately coöperating parts located at one end of the tool. Fig. 4 is a similar detail view of the sliding hammer and part of its tripping mechanism, and Fig. 5 shows the central sliding spindle removed from the casing and in association therewith the parts at the opposite end of the tool which contain the returning-spring with the mechanism for locking the casing against rotation on the spindle and permitting a sliding movement relatively thereto.

Referring to the drawings in detail, 6 designates the central outer cylindrical sheath or casing of the device, the same being provided near the center thereof with a small stop-screw 7, which passes through the shell of the casing and extends a short distance into the interior thereof for a purpose that will hereinafter appear. This casing 6 is internally threaded for a short distance at each end thereof and at its right-hand end, as shown in the drawings, receives the screw-threaded shank of an externally-tapered sleeve 8, constituting an element of the outer casing of the device. The opposite or left-hand end of the casing 6 similarly receives a screw-threaded plug 9, against which abuts an internally-threaded sleeve 10, the plug 9 and sleeve 10 also constituting elements of the external casing of the tool, and the sleeve 10, in coöperation with mechanism hereinafter described, affording the means whereby the hammer-actuating spring is adjusted.

11 designates a straight spindle of uniform diameter extending coaxially through the entire outer casing of the tool. This spindle is internally threaded for a short distance at each end, as indicated in Fig. 2, to receive the shanks of impact-tools of varying sizes and shapes suited to the various requirements of service.

Mounted to slide longitudinally on the spindle 11 and approximately centrally thereof is the hammer 12, and immediately in advance of the latter and integral with or securely fixed on the spindle is a cone-shaped collar 13, the base of which lies toward the impacting-face of the hammer. Pivotally mounted

in a slot extending longitudinally of the forward body portion of the hammer is a trigger 14, this latter having a forwardly and inwardly bent nose 14^a, projecting somewhat in advance of the forward face of the hammer, and a beveled or oblique rearward extension 14^b, which lies within an annular recess 15, formed circumferentially in the body of the hammer, into which recess the lower end of the stop-screw 7 also extends, as plainly shown in Fig. 2. A light leaf-spring 16, lying in and at the rear of the slot in which the trigger 14 is pivoted, bears against the under side of the rear end of the latter, thereby normally tending to force inwardly the nose 14^a of the trigger behind and in abutting engagement with the base of the collar 13, as shown in Fig. 2.

In rear of the hammer 12 and pressing against the same is located a coiled compression-spring 17, which latter by virtue of its inherent quality of compression and expansion stores and subsequently gives out to the hammer in impact form the power of the operator imparted through the forward or rearward thrust of the outer casing 6 relatively to the spindle 11. The rear end of this spring abuts a collar 18, carried at the end of an adjustable sleeve 19, surrounding and in sliding contact with the spindle 11. The plug 9 has an endwise extension in the nature of a smooth sleeve 20, the extremity of which latter is slightly reduced in diameter and externally threaded, as shown at 21, to receive an internally-threaded end nipple 22, constituting the end element of the external casing of the device. The sleeve 20 has a longitudinal slot 23 extending the entire lingth thereof, within which slot is adapted to play an externally-threaded segment 24, constituting a radial projection of the sleeve 19.

The foregoing construction, it will be observed, affords a simple and effective means for adjusting the compression of the spring 17. This adjustment, it will be observed, is determined by the longitudinal set of the sleeve 19 and its integral threaded segment 24 relatively to the rotatable internally-threaded adjusting-sleeve 10. By reason of the fact that the outer surface of the sleeve 20 is smooth the rotation of the surrounding sleeve 10 thereon obviously has no effect upon the relative longitudinal disposition of said sleeve, the rotation of said sleeve 10 being designed to effect only the shifting of the inner sleeve 19 and the abutment-collar 18, connected therewith.

At the opposite end of the instrument and surrounding the spindle 11 is a small coiled spring 25, the function of which is to automatically restore the casing and the spindle to their proper relative positions after each blow of the hammer preparatory to the imparting of the next succeeding blow—in other words, to automatically reset the tripper mechanism to a position adapted to store the energy of the spring on the next thrust or pull of the casing relatively to the spindle. This spring 25 is located between a collar 26, rigid on the spindle, and a suitable receiving recess or pocket formed in the adjacent end of a short sleeve 27, also surrounding the spindle and lying within the inner end of the sleeve 8. As herein shown, the head of the sleeve 27 engages the corresponding head of the sleeve 8 by its screw-threaded connection, these parts being secured against rotation relatively to each other by a screw-pin 28, which passes through them both in a direction at right angles to their common axis, the inner end of this pin penetrating a longitudinal groove or slot 11^a, formed in the spindle 11, whereby the sleeves 27, 8, and 9 and the casing 6 are kept from rotation on the spindle with freedom for longitudinal movement thereon.

It will be observed that the outer cylindrical casing 6 is in the form herein shown constructed in three connected sections, the intermediate section being somewhat less in diameter than the two end sections, which latter are alike in respect to form and size. This construction provides a shoulder 6^a at that end of the intermediate section lying just in rear of the trigger 14, which shoulder is designed to ride over the inclined rear end 14^b of the trigger, and for this purpose the engaging end of the said intermediate section of the casing is beveled or inclined to correspond with the inclined surface of the trigger, so as to provide a cam action in riding over the latter which shall serve to depress the rear end of the trigger through sliding contact therewith and with but slight friction thereon. Where the casing 6 is made in the form of a single integral sleeve of uniform diameter throughout, its inner wall will of course be provided with a suitable cam projection for the purpose already described. The leaf-spring 16 keeps the inclined end of the trigger normally elevated in a position to be engaged and depressed by the shoulder 6^a as the casing is moved to the right over the spindle.

The operation of my improved plugger will readily be understood from the foregoing description of its construction in connection with the illustration. Assuming that the device is to be used in connection with a forward movement or thrust thereof relatively to the tooth or other object operated upon, a suitable impact-tool (indicated at 29) is inserted in the right-hand end of the spindle 11. As the blunt head of the tool 29 is pressed against the object to be impacted and the casing 6 is pressed forward toward the tool 29 the spring 17 is gradually compressed owing to the fact that the abutment-collar 18 is carried forward with the casing 6 owing to its union with the latter through the connections already described, while the opposite or forward end of the spring is held stationary relatively to the spindle by its abutment against the rear end of the hammer, the for-

ward end of which latter is fixed relatively to the spindle by means of the collar 13 and the trigger 14. The spindle and the hammer thus remaining longitudinally stationary while the outer casing moves longitudinally therealong, the inclined shoulder 6^a approaches the inclined rear end 14^b of the trigger and as it rides thereover elevates the nose 14^a of the trigger out of engagement with the collar 13, and thus allows the stored energy of the spring to be imparted suddenly to the hammer 12, which latter strikes a quick blow upon the collar 13, the force of which blow is transmitted through the spindle and the tool 29 to the object or material operated upon. This advance movement of the casing 6 and its connected sleeves 8 and 27 effects a compression of the returning-spring 25, so that when the pressure or thrust upon the casing is intermitted the spring 25 at once reacts in a manner to again advance the spindle relatively to the casing, thus restoring the parts to the relative positions shown in Fig. 2, in which they are ready for the next forward thrust on the part of the operator.

The manner in which the spring 17 may be adjusted for the purpose of regulating the force of the blow will be apparent from the description already given. This adjustment is determined by the relative set given to the sleeves 10 and 19 through the threaded segment 24. When the parts are in operative position, the sleeve 10 is always in close engagement with the abutting end of the block 9, being held thus by means of the nipple 22, which has also the function of a lock-nut, screwing over the threaded extremity 21 of the sleeve 20, which latter is integral with or rigidly secured to the block 9. When the compression of the spring 17 is to be increased, so as to increase the force of the blow administered thereby, the sleeve 10 is rotated between the block 9 and the nipple 22 in a direction to carry the segment 24, and consequently the abutment-collar 18, inwardly of the casing. When the compression of spring 17 is to be decreased, so as to diminish the force of the blow, the sleeve 10 is simply turned in the opposite direction, thus moving the abutment-collar 18 outwardly of the casing.

The set-pin 7, lying within the annular groove or recess 15 of the hammer, serves to limit the longitudinal travel of the latter relatively to the casing, and by limiting the extent of forward movement of the hammer relatively to the casing under all adjustments of the spring 17 renders certain the action of the spring 25 after a blow has been struck in carrying forward the spindle through a sufficient extent to insure the interlocking engagement of the trigger 14 and collar 13.

It will be observed that the hammer 12 is free to turn on its longitudinal axis relatively to the spindle 11, whereby the nose of the trigger may engage the collar at different points on the periphery of the base of the latter, thus preventing the wear of the parts that would result were the hammer and the collar non-rotatably fixed relatively to each other, and consequently increasing the life of the tripping mechanism. The same is true of the coacting cam-faces 6^a and 14^b.

It will be evident that my improved plugger is capable of use in connection with a tool applied at either end thereof. Where the impacting of the material can most conveniently be effected by a push or thrust on the part of the operator, an impacting-tool of the general character indicated at 29 will be employed in the right-hand end of the instrument, as shown in the drawings; but where this impacting of the filling material can best be accomplished by a pull of the operator outwardly relatively to the tooth being operated upon a bent or hooked impact-tool of the general character indicated at 30 in the left-hand end of the instrument, as shown in the drawings, will be used. Such an operation of the instrument is frequently found convenient in filling the sides and undercut portions of dental cavities. By supplying the instrument with an impact-tool of each variety at its respective ends the operator need only turn the tool about when desirous of replacing the use of one tool by the use of another.

From the foregoing it will be seen that my invention provides an improved tool of the class described characterized by the possession of a sensitive quick-acting tripping mechanism adapted to give a sharp, clearly-defined, and distinct blow to the spindle in combination with a delicate and fine adjustment of the power-spring, which may be effected by the simple turning of an adjusting-sleeve, which latter constitutes an element of the external casing of the tool and is therefore manipulated with the greatest facility.

It will be evident that changes and modifications of the specific structure of the tripping and adjusting mechanisms hereinabove described, and illustrated in the drawings, might be made without departing from the spirit and principle of my invention. For instance, as a mechanical equivalent the trigger might be pivoted on the fixed collar and abut the hammer instead of the relative arrangement of said parts as shown, or other and equivalent means might be employed for locking the adjusting-sleeve 10 in endwise abutting engagement with the block 9. I do not, therefore, limit the scope of my invention to the precise form, construction, and arrangement of elements herein shown and described, except to the extent that the latter may be made the subject of specific claims.

I claim—

1. In a dental plugger, the combination with a spindle and an outer casing longitudinally slidable thereover, of a hammer longitudinally movable on the spindle, a power-spring for actuating the hammer, a fixed projection on the spindle adapted to be struck by the hammer,

a pivoted trigger on the hammer adapted to overhang one end of the latter and abut said fixed projection, and a trigger-releasing device carried by and movable with the casing, substantially as described.

2. In a dental plugger, the combination with a spindle and an outer casing longitudinally slidable thereover, of a hammer longitudinally movable on the spindle, a power-spring for actuating the hammer, a fixed collar on the spindle adapted to be struck by the hammer, a trigger pivoted on the hammer longitudinally thereof and having an overhanging nose adapted to abut the contiguous face of the collar, means normally tending to maintain the engagement of the trigger with the collar, and a cam-shoulder carried by the casing and adapted to engage and depress the opposite end of the trigger to raise the nose of the latter out of engagement with said collar, substantially as described.

3. In a dental plugger, the combination with a spindle and an outer casing longitudinally slidable thereover, of a hammer longitudinally movable on the spindle, automatic tripping mechanism for releasing said hammer, a power-spring engaging and actuating the hammer, a longitudinally-movable abutment for said power-spring, and a rotatable sleeve forming a section of the external casing and effecting the longitudinal adjustment of the abutment-collar by its rotation, substantially as described.

4. In a dental plugger, the combination with a spindle and an outer casing longitudinally slidable thereover, of a hammer longitudinally movable on the spindle, automatic tripping mechanism for releasing said hammer, a power-spring engaging and actuating the hammer, an abutment-collar for said power-spring provided with a longitudinally-slidable sleeve extension surrounding the spindle, an externally-threaded segment on said sleeve extension, and an internally-threaded adjusting-sleeve engaging said threaded segment and by its rotation effecting the longitudinal travel of the latter and the abutment-collar, substantially as described.

5. In a dental plugger, the combination with an outer casing and a spindle extending coaxially therethrough over which the casing has a limited sliding movement, of a hammer longitudinally movable on the spindle, automatic tripping mechanism for releasing said hammer on the forward travel of the casing relatively to the spindle, a power-spring engaging the rear end of the hammer, an abutment-collar for said power-spring provided with a longitudinally-slidable sleeve extension surrounding the spindle, an externally-threaded segment on the outer end of said sleeve extension, an end block closing the rear end of the casing, said block having a longitudinally-slotted sleeve extension surrounding the sleeve extension of the abutment-collar and accommodating the travel of the threaded segment through its longitudinal slot and further provided with a screw-threaded end, an internally-threaded adjusting-sleeve surrounding the extension-sleeve of the end block and abutting the latter endwise, and a lock-nut engaging the screw-threaded extremity of said last-named extension-sleeve and confining the adjusting-sleeve between itself and the end block, substantially as described.

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