No. 714,983. Patented Dec. 2, 1902.

C. P. WILSON.

DENTAL INSTRUMENT.

(Application filed June 21, 1902.)

(No Model.) 2 Sheets—Sheet 1.

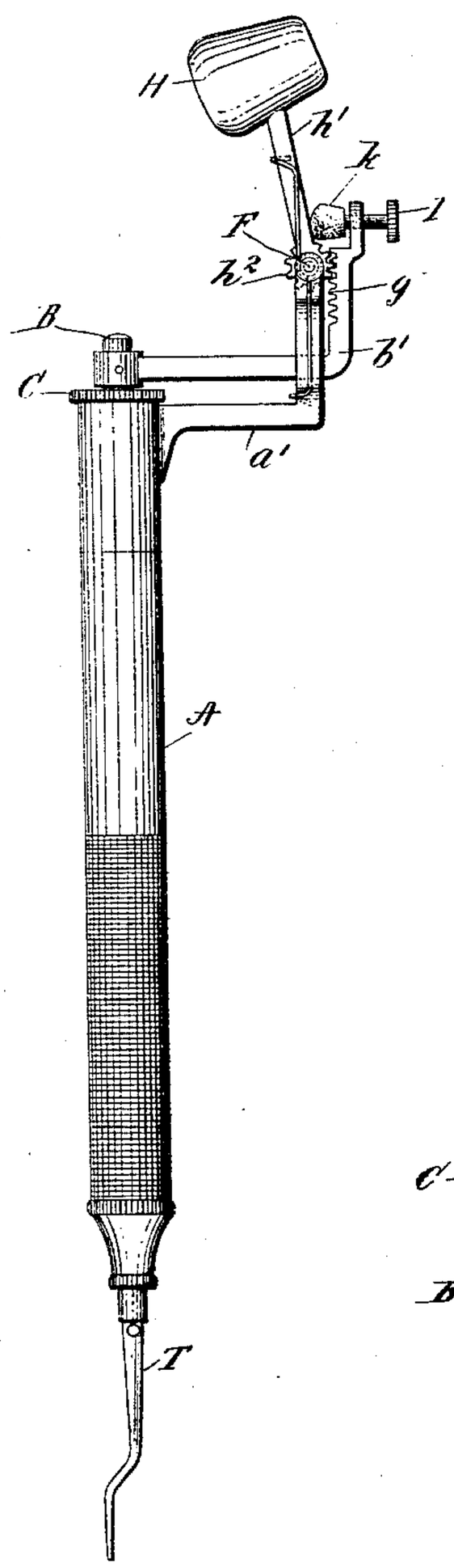

Fig. 1.

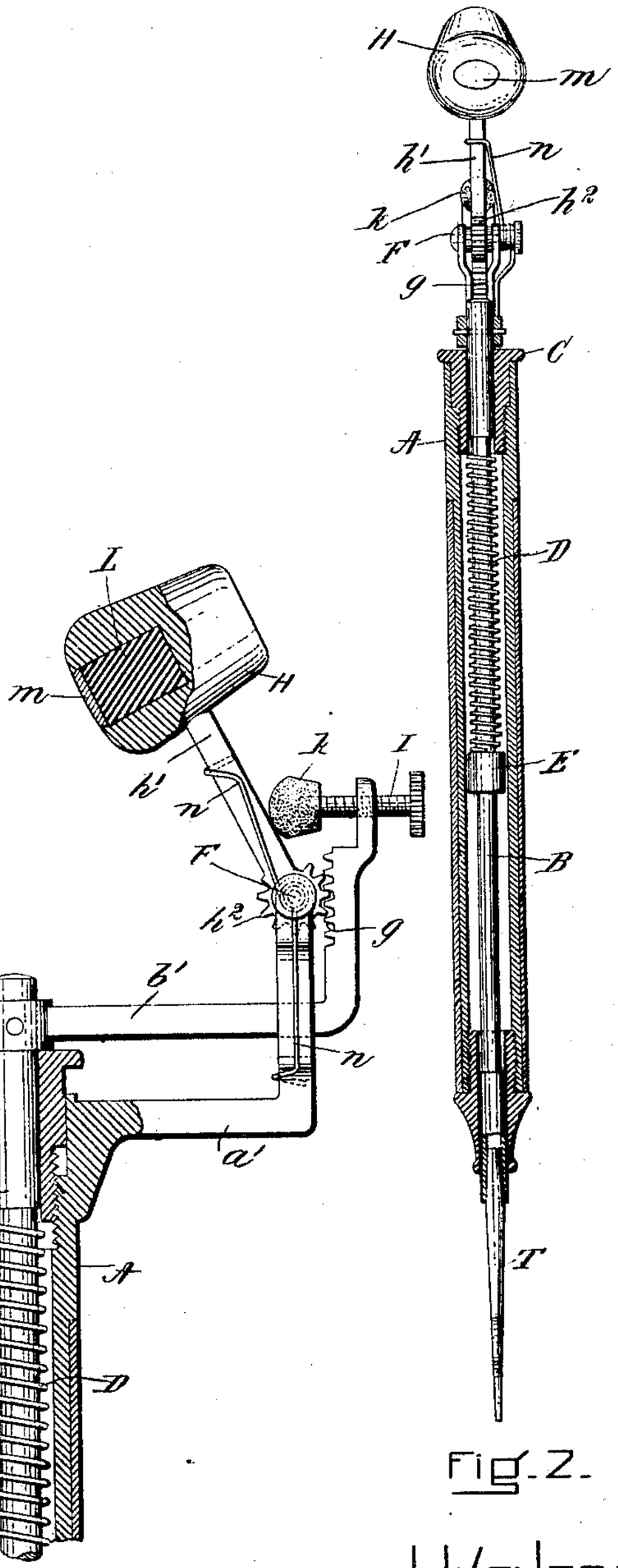

Fig. 3.

Fig. 2.

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Fig. 4.

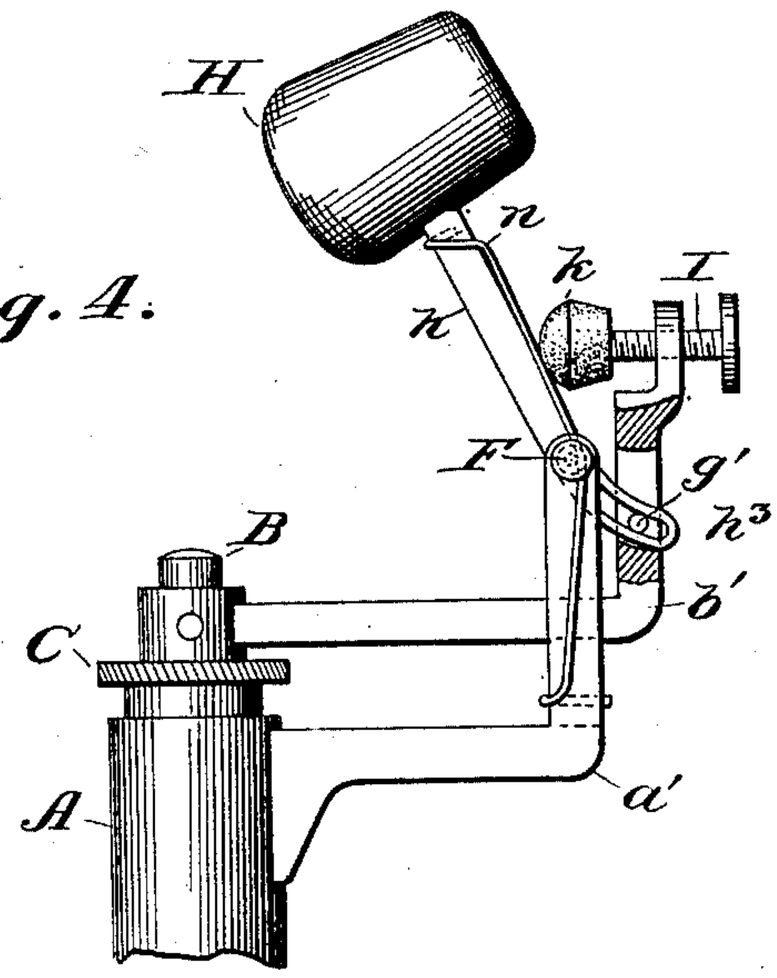


Fig. 5.

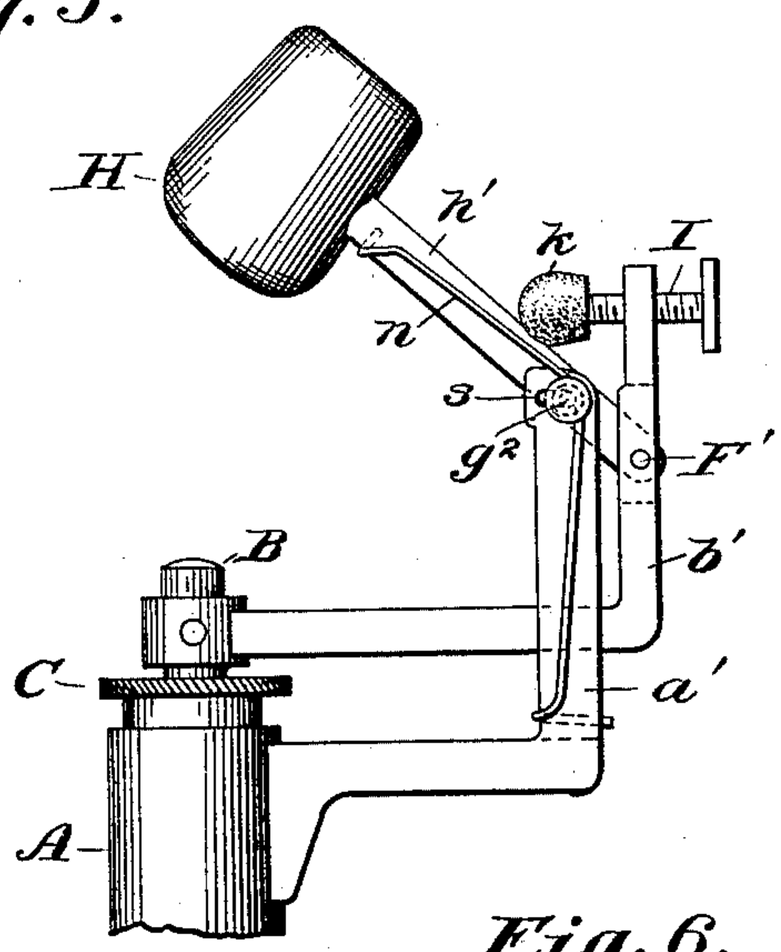
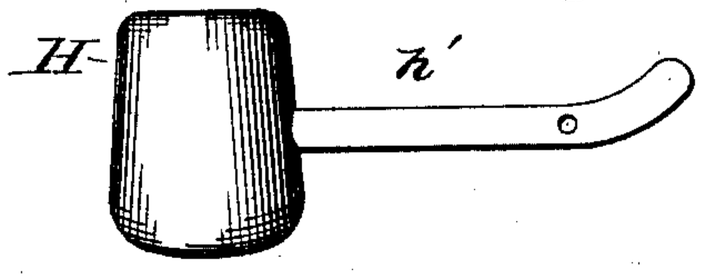


Fig. 6.



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UNITED STATES PATENT OFFICE.

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DENTAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 714,983, dated December 2, 1902.

Application filed June 21, 1902. Serial No. 112,598. (No model.)

To all whom it may concern:

Be it known that I, CECIL P. WILSON, a citizen of the United States, residing at Newton, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Dental Instruments, of which the following is a specification.

The improvement relates to dental instruments, particularly to that class commonly known as dental "mallets" or "pluggers," for use in packing gold in dental cavities; and the invention consists in a tilting hammer or mallet the helve of which is in direct and immediate engagement with two extensions or brackets, one rigidly attached to the member of the instrument which carries the plugging-tool and the other to the member of the instrument which is grasped by the operator and slides upon the tool-carrying member when the instrument is in use. For convenience I will hereinafter refer to all that portion of the instrument which carries the plugging-tool at one end as the "tool" member and to all that portion of the instrument which moves upon the tool member when the instrument is in use and which is grasped by the hand of the operator as the "hand" member.

Heretofore in dental instruments of this character the hammer-helve has been engaged by the two members of the instrument through a multiplicity of intermediate links, levers, and joints, and their action has been to push the hammer to its operative impact. Such construction is very inefficient and defective in operation and, so far as I am aware, has never been made for sale nor put to practical use by the dental profession.

It is a well-understood fact that the blow of a hammer wielded in the hand is superior to and far more effective in the operation of filling teeth than that produced by any other means, particularly by a spring which is now commonly employed for the purpose or by a weight or mallet forced against the end of the tool member by any mechanical means which have been heretofore attempted, but without practical success. By my greatly simplified and improved construction the hand operation of wielding the hammer is more nearly imitated than by any previously-employed mechanical devices, for, as heretofore set forth, the hammer-helve is directly engaged by rigid extensions upon the respective members of the instrument without any intervening parts or joints to produce lost motion and inaccuracy of movement, and the hammer-helve is taken hold of—that is, the motive power is applied—between its outer end or fulcrum-point and the hammer-head, which latter is pulled to its work instead of being pushed. Thus its operation is as a lever of the third order, which is the most effective and advantageous in an instrument of this construction. Also to obtain the greatest efficiency with a minimum of relative movement between the two members of the instrument I arrange the points of engagement of the two rigid extensions with the hammer-helve in close proximity. Thus a very small movement of the hand member toward the plugging-tool will cause the hammer-head to swing through a considerable arc.

In the drawings forming a part of the specification several simple and effective forms of mechanism for wielding the hammer are shown, but all are within the scope of my invention—namely, to connect the hammer-helve immediately with the hand member and the tool member in such manner that the blows given by it will be the most efficient and accurate, wholly under the control of the operator and not dependent upon a spring or other means which after adjustment make successive blows all alike.

In the drawings, Figure 1 is what may be termed a "side" elevation of the instrument, in which the hammer is operated by a pivot-pin, as the engagement with the hand member and a rack and pinion with the tool member. Fig. 2 is a front longitudinal sectional elevation of the same. Fig. 3 is an enlarged side elevation of the upper part of the same instrument with the hand member and a portion of the hammer in section. Fig. 4 is a side elevation of the upper part of the instrument with a portion of the bracket on the tool member broken away to show a slot into which the end of the hammer projects, where it is engaged by a pin in the tool member. Fig. 5 is a further modification in which the engagement of the hammer-helve with the tool member is by a fulcrum-pin and with the hand member by a slot therein engaged by a projection or pin on the helve.

Fig. 6 shows a form of hammer-helve which may be used in place of the one illustrated in Fig. 4, the slot in the hammer-helve and the pin in the tool member being dispensed with.

Referring to the drawings, A is the outer or hand member of the instrument, here shown in the form of a tubular sleeve, which may slide longitudinally upon the tool member B.

To facilitate description, the instrument will be referred to as in the perpendicular position shown in the drawings and the various parts in positions relative thereto.

In the upper end of the hand member A—that is, the end opposite the plugging-tool—is an externally-threaded tubular plug C, which may be adjusted in and out of the member A for the purpose of regulating the tension of the spring D, coiled about the member B, between a collar E upon that member and the inner end of the plug C; also, by changing the position of the plug C the length of the arc through which the hammer swings when operated may be regulated. To the upper end of the member A an angular extension or bracket a' is attached, and to the end of this bracket a tilting hammer H is secured by a pivot F through the end of the hammer-helve h'. To the upper end of the member B which projects beyond the plug C another angular bracket b' is secured. As illustrated, one portion of each of these brackets projects laterally at right angles to the axis of the member B and another portion vertically or parallel with its axis, and the vertical portion of the bracket a' is slotted or made in two parts and embraces the lateral portion of the bracket b' and also the end of the hammer-helve pivoted to one of the brackets. The lateral portion of the bracket b' is a little longer than the lateral portion of the bracket a', and the vertical portion of the former extends up parallel with and a little outside of the vertical portion of the latter. In Figs. 1 to 3 upon the side of the vertical portion of the bracket b' adjacent to the bracket a' a series of rack-teeth g are formed, which are engaged by the teeth of a segment of a pinion h^2, formed in the enlarged end of the hammer-helve h', concentric with the pivot F. It will be seen, therefore, that when the hand member A is slid longitudinally over the tool member B the vertical portions of the two brackets a' b' will likewise move past each other in the same direction that the parts A and B do, and, by reason of the engagement of the teeth of the pinion h^2 and rack g, the hammer H will be caused to tilt upon its pivot F. When the member A is moved downward over the member B—that is, toward the plugging-tool T—the hammer will tilt down, and when the movement is sufficient the hammer will strike the end of the member B with a blow like that produced by the tilt of a hammer when wielded in the hand. When the instrument is in use, the member B maintains a fixed position, with the tool T in the cavity of the tooth, and then by pressure downward upon the member A it slides over the member B and the hammer is tilted down against the end of the member B. As soon as the downward pressure upon the member A is relieved the spring D, having been compressed between the collar E and the plug C, will force the member A upward again and cause the vertical part of the bracket a' to move past that of the bracket b' in the opposite direction and, through the engagement of the rack g and pinion h^2, to tilt the hammer up to the position shown in the drawings. This upper position of the hammer may be regulated by an adjusting-screw I in the end of the bracket b', and to prevent the jar and recoil of the metal parts when they come into contact a cushion k, of leather or other relatively soft material, may be attached to the end of the screw I, and also to deaden as far as possible the metallic click between the hammer and the end of the member B, I fill a chamber L in the face of the hammer with a soft metal, preferably lead, which serves the purpose best when the chamber is filled by compressing or hammering small pieces into it and then cover this with a thin plate of harder metal m, which is not easily malleable, such as the alloy known as "white metal," which I have found extremely well adapted to withstand the repeated blows of the hammer made continually upon the same small area of the face. For some uses rawhide, hard rubber, or other materials of kindred hardness may be used in place of soft metal. I have also found that the instrument operates more easily if a portion of the power employed to raise the hammer is applied directly thereto instead of relying wholly upon the spring D. This I accomplish by using a spring of small power, such as a steel wire n, which may be coiled about the pivot F and have the two ends extend therefrom and respectively engage the hammer-helve and the vertical portion of the bracket a'.

In Figs. 4, 5, and 6 are shown some of the simple modifications which may be employed for connecting the hammer with the brackets a' b'. In Fig. 4 the helve is pivoted to the hand member at F and the end of the helve, which is provided with a curved slot h^3, projects through a slot in the bracket b' and is engaged by a pin g' therein, which passes through the slot h^3 in the hammer-helve. The form of helve shown in Fig. 6 may be used in place of that shown in Fig. 4 and without the use of the pin g', the curved end of the helve bearing against the ends of the slot in the bracket b' when the instrument is in operation. In Fig. 5 the hammer-helve is pivoted at F′ in the bracket b', and by means of a pin g^2, which projects from the helve into slots s in the forked end of the bracket a', the hammer will be tilted up and down upon its pivot F′ when the hand member A is

moved upon the tool member B; but all of these forms come within my invention and enable the operator to manipulate the mallet effectually and at will, as though it was wielded in his hand.

The varied advantages of my improved automatic mallet will be seen by holding the instrument with the mallet in different positions in a circle which the ends of the brackets a' b' will describe when the tool is rotated in the hand. For instance, if the tool is held in an inclined position and the hammer is allowed to hang down below the member A it will require considerable effort to compress the spring D and overcome the inertia of the hammer, and consequently a much harder blow will be given, while if the hammer is turned into the opposite position, so that it will be upon the upper side of the inclined instrument, a very delicate light blow can be given, for the reason that the weight of the hammer itself tends to move it toward the end of the tool member, and thus to assist in compressing the spring D.

I claim—

1. In a dental instrument, the combination of a tool member and a hand member adapted to move longitudinally thereon, a rigid extension upon each of such members, a tilting hammer comprising a head and helve, and means to put the helve in immediate operative engagement with both rigid extensions.

2. In a dental instrument, the combination of a tool member and a hand member adapted to move longitudinally thereon, a rigid extension upon each member, a tilting hammer comprising a head and helve, and means upon the helve and rigid extension, to effect the immediate operative engagement of the helve with the rigid extensions as a lever of the third order, when operated by movement of the hand member.

3. In a dental instrument, the combination of a tool member and a sliding hand member thereon, a tilting hammer the helve of which is pivoted in a rigid portion of the hand member, rigid devices upon the tool member which directly engage the end of the hammer-helve and coöperate to cause the hammer and the pivotal connection of its helve to move in the same direction as the hand member when that moves toward or from the plugging-tool.

4. In a dental instrument, the combination of a tool member, a sliding hand member thereon, a rigid bracket upon the respective members, a hammer with its helve pivoted to the bracket of the hand member and means whereby the end of the helve is put in direct operative engagement with the bracket of the tool member, substantially as set forth.

5. In a dental instrument, the combination of a tool member and a hand member constructed to move longitudinally thereon, a tilting hammer pivoted upon one of the members, means to cause the hammer to strike the tool member when the hand member is pressed toward the tool, and to withdraw the hammer when the pressure is relieved, and a cushion to arrest the movement of the hammer in its backward movement.

6. In a dental instrument, the combination of a tool member and a hand member constructed to move longitudinally upon each other, a tilting hammer adapted to strike the tool member by the movement of one member upon the other, and an impact-section for the hammer which has a soft-metal body and a hard-metal face, for the purpose described.

7. A hammer for a dental plugger consisting of a block of metal provided with an impact-section consisting of relatively softer material and a hard face, for the purpose described.

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