Feb. 10, 1931. O. H. PIEPER 1,792,121

SWITCH HANDLE AND INSTRUMENT HOLDER

Original Filed Sept. 20, 1926

Fig. 1.

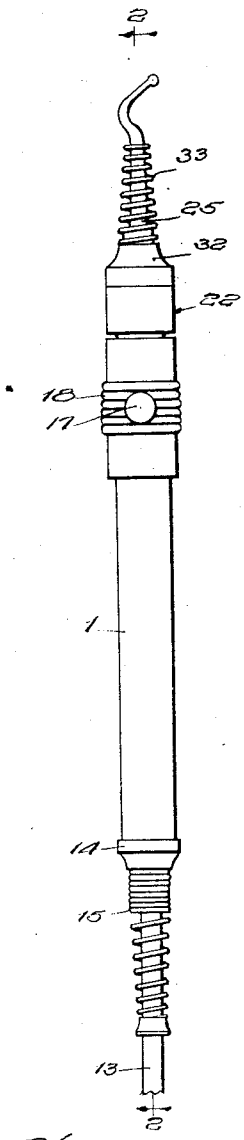



Fig. 2.

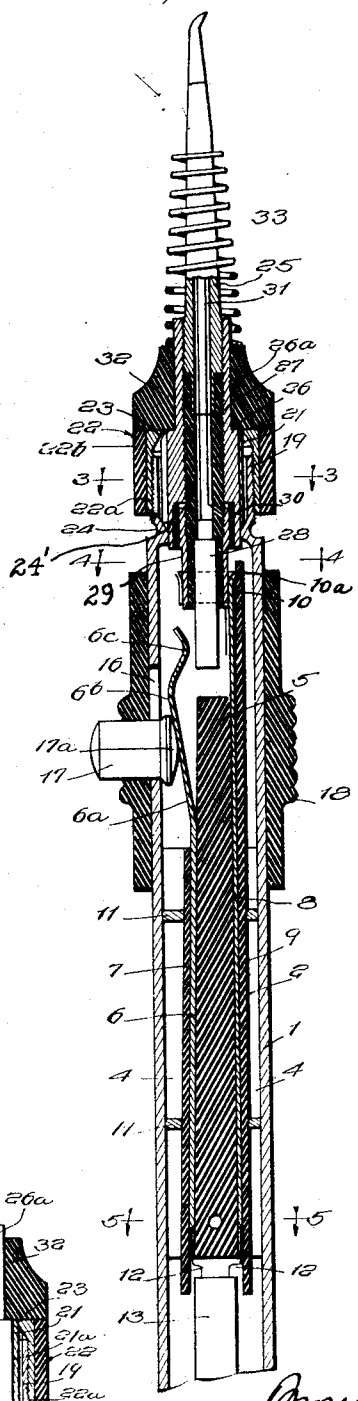



Fig. 3.

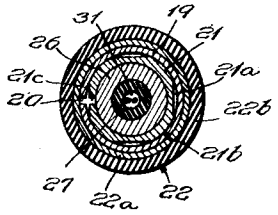



Fig. 4.

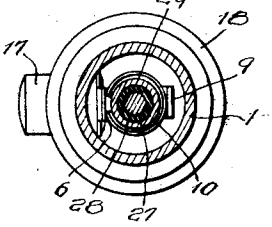



Fig. 5.

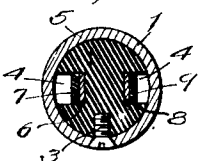



Fig. 6.

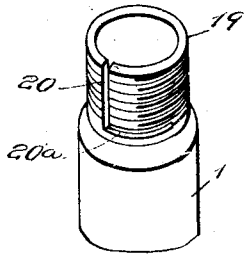
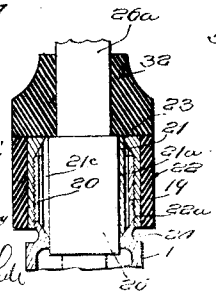



Fig. 7




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Patented Feb. 10, 1931

1,792,121

# UNITED STATES PATENT OFFICE

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## SWITCH HANDLE AND INSTRUMENT HOLDER

Application filed September 20, 1926, Serial No. 136,501. Renewed December 16, 1929.

This invention relates to dental instruments, and more particularly to what I term a switch handle and instrument holder.

Instruments of this type are intended for holding an instrument which is heated electrically for use in dental work. The circuit through the heating element of the instrument is controlled by a switch member slidable on the hand piece which, necessarily, provides a projection which interferes, to a certain extent, with manipulation of the hand piece. In devices of this sort as at present constructed the instrument is secured in the hand piece in such manner as to render it difficult or impossible to adjust the instrument relative to the switch member, and this frequently seriously interferes with use of the instrument. A further objection to the present construction of devices of this character is that adequate provision is not made for protecting the operator and the patient from being burned by parts of the instrument and the hand piece, particularly at the point of juncture between these members.

This invention is intended more particularly as an improvement over the device disclosed in my application for instrument holder, Serial No. 99,296, filed April 2, 1926. One of the main objects of my invention is to avoid the objections above noted to devices of this general character and to produce a device of simple and highly efficient construction in which the instrument can be quickly and easily secured in the hand piece and can be readily adjusted relative to the switch operating member. A further important feature of my invention is the provision of means whereby the hands of the operator, and the patient are effectually protected from being burned by the hot part of the device. A further object is to provide means whereby proper contact of the terminal elements of the instrument with the contact members of the hand piece will be insured at all times. Further objects will appear from the detail description.

In the drawings:—

Figure 1 is an elevation of a device constructed in accordance with my invention;

Figure 2 is a section taken substantially on line 2—2 of Figure 1, parts being omitted and other parts being shown in elevation;

Figure 3 is a section taken substantially on line 3—3 of Figure 2;

Figure 4 is a section taken substantially on line 4—4 of Figure 2;

Figure 5 is a section taken substantially on line 5—5 of Figure 2;

Figure 6 is a perspective detail of the fixed portion of the hand piece; and

Figure 7 is a fragmentary section, parts being shown in elevation, showing the position of the securing sleeve and associated parts when the instrument is secured in the hand piece.

The device or tool includes a tubular hand piece 1 within which is mounted an elongated cylindrical core 2 of electrical insulating material, this core being secured in position by means of a screw 3 or in any other suitable or preferred manner. Core 2 is provided with channels 4 disposed diametrically opposite of the core and extending the full length thereof. The central portion of the core projects beyond the body thereof to form an extension 5. A contact strip 6 is mounted in one of the channels, a strip of insulation 7 being positioned at the outer face of strip 6. The upper portion 6*a* of strip 6 is disposed at an angle to the body portion of this strip and is rounded at 6*b*, having a reversely curved terminal element 6*c*. A resilient strip 8 of electrical conducting material is mounted in the other channel strip 4 and a strip 9 of insulating material is positioned at the outer face of strip 8. This strip 9 extends the full length of strip 8 and strip 8 is provided at its upper end with a split sleeve 10, the upper portion of which is flared as at 10*a*. The contact strips 6 and 8, together with cooperating insulating strips 7 and 9, respectively, are held in position by retaining rings or bands 11 which fit tightly about core 2 in suitable grooves provided to accommodate these bands. Electrical conductors or wires 12 of a cord or cable 13 are connected to the contact strips, this cable passing through a suitable ring 14 secured on the lower end of hand piece 1 in a known manner, a coiled guard or protector 15 being carried by the ring and extending about the

cord 13. The core 2 and the parts carried thereby constitute a unit which can be readily inserted into the hand piece 1 and secured in position by means of the screw 3, or in any other suitable or preferred manner.

Hand piece 1 is provided with a longitudinally extending slot 16 which accommodates the body portion of a button 17 carried by a sleeve 18 slidable on the hand piece. Head 17*a* of the button is disposed to engage portion 6*b* of contact strip 6 so as to move the terminal portion 6*c* of this strip into operative position when the sleeve 18 is moved into its uppermost position for closing the circuit of the instrument used in connection with the hand piece. Sleeve 18 is of appreciable length and is formed of a suitable heat insulating material, such as a synthetic resin commercially known as "bakelite," though any other suitable material may be employed for this purpose. This sleeve, due to its length and heat insulating properties, is of assistance in protecting the user's hand against burning by the heated parts of the device, as well as serving as means for controlling the circuit, as will be later set forth in more detail.

Hand piece 1 is provided at its upper end with an exteriorly threaded neck 19 having an L-shaped slot therein, the vertical portion 20 of which extends from the top to the bottom of the neck, the horizontal portion 20*a* of the slot extending circumferentially of the neck at the lower end thereof and for an appreciable distance. The provision of this slot permits distortion of the neck for clamping the same tightly around a resilient split sleeve 21 mounted within neck 19 concentrically therewith. A clamping ring or collar 22 is threaded on neck 19 and includes an inner metallic member 22*a* and an outer heat insulating member 22*b* which is preferably formed of the same material as sleeve 18. Member 22*a* is provided at its upper end with a shoulder 23 extending inwardly thereof and having its inner surface inclined downwardly and radially outwardly of member 22*a*. Hand piece 1 is provided at its upper end with a restricted portion 24 forming a shoulder 24′ at the base of neck 19, and the inner face of this shoulder is inclined oppositely to the inner face of shoulder 23. The ends of sleeve 21 are oppositely beveled to seat on the shoulders 23 and 24′ and the sleeve is of such length that, when collar 22 is threaded onto the neck into full operative position the sleeve is contracted and the inclined end surfaces thereof are brought into gripping contact with the shoulders 23 and 24′ so as to secure the sleeve to the hand piece. It is also to be noted that the neck 19 is of sufficient length to contact at its upper end with the shoulder 23 as collar 22 approaches its full operative position on the neck. This serves to distort neck 19 sufficiently to force the portion of the neck defined by the L-shaped slot 20 and 20*a* into gripping contact with the sleeve 21. In this manner the sleeve and the neck are secured together frictionally so as to prevent relative movement between the same, when the collar 22 is threaded into full operative position.

The hand piece 1 and associated parts are adapted for use in connection with an electrically heated dental instrument. The instrument shown is intended for use in connection with gutta-percha fillings and for other purposes and includes a body 25 secured in a neck 26*a* of a base member 26. An insulating tube 27 extends from body 25 through the base member 26 and carries at its lower end an inner terminal element 28 of electrical conducting material which is disposed in concentric relation to an outer terminal element 29 insulated from member 28 by the reduced lower portion of tube 27. The lower portion of base member 26 is recessed from the lower end thereof to receive an insulating thimble 30 which surrounds the outer end portion of contact or terminal element 29 and effectually insulates the same from the base member. A resistance element 31 is mounted within the instrument 25 and has its ends connected to the terminal elements 28 and 29. It will be noted that by this construction the terminal element 28 is disposed co-axially with hand piece 1 when the instrument is secured in position and the terminal element 29 is disposed in concentric relation to member 28 and also co-axially with the hand piece. In applying the instrument to the hand piece the base portion 26 is inserted through sleeve 21. This insertion of the instrument results in terminal element 29 being inserted through the contact collar 10. As the outer end of collar 10 is flared at 10*a* and the contact strip 8 is resilient, proper insertion of contact element 29 through the collar is insured at all times even through the collar may be slightly out of truly co-axial position in relation to hand piece 1. This feature of my invention is of great importance from a practical standpoint as it permits adjustment of the instrument while insuring proper contact between the sleeve 10 and element 29 at all times, which would not be possible if a flat contact strip or spring were pressed against member 29 as is frequently done. After the instrument has been properly inserted collar 22 is threaded onto neck 19 into its full operative position. This serves to contract sleeve 21 into gripping contact with base portion 26 of the instrument, and also serves to contract the neck 19 into gripping contact with sleeve 21. In this manner the sleeve and the instrument are effectively secured in adjustment and to the hand piece. After the instrument has been secured in position element 6*c* of contact strip 6 may be forced into contact with terminal ele-

ment 28 by moving the sleeve 18 towards the upper end of hand piece 1 into contact with collar 22. This serves to close the circuit through the resistance 31 thus heating the instrument. To break the circuit of the resistance 31 sleeve 18 is returned to its inoperative position illustrated in Figure 2.

The instrument is provided with a relatively wide and fixed collar 32 formed of a suitable heat insulating material, such as the synthetic resin previously referred to and known commercially as "bakelite". When the sleeve 18 is in its outermost or operative position for closing the circuit of the instrument, the outer end of this sleeve is positioned in contact with collar 22, collar 32 forming with collar 22 and sleeve 18 a continuous heat insulating structure which extends a relatively great distance above and below the area of contact between the base member 26 of the instrument and the neck of the hand piece and associated parts. I consider this particular relation between the collar and the sleeve of importance as preventing the operator's hand from being burned. As the instrument used is frequently heated to a high temperature, the base member and the portion of hand piece 1 adjacent neck 19 are frequently heated by convection to a sufficiently high temperature to burn the operator's hand. Danger of burning of the operator's hand from this cause is eliminated, however, by providing the relatively long sleeve 18 and the collars 32 and 22 associated therewith and related in the manner illustrated and described.

As will be noted more clearly from Figure 3, the split sleeve 21 is of approximately octagonal shape in cross section and includes four flat surfaces 21*a* and four rounded surfaces or corner portions 21*b* which contact with the inner surface of sleeve 19. Preferably, though not necessarily, the sleeve 21 is positioned within neck 19 so that the slot 21*c* thereof is in alignment with the vertical portion 20 of the slot of the neck. This positions two of the rounded corners 21*b* adjacent slot 20 so that when the neck is contracted in the manner described a very appreciable binding or gripping action between the sleeve and the neck takes place which supplements the gripping action between the ends of the sleeve and the shoulders 23 and 24 for securing the sleeve and the neck together. The instrument can be readily adjusted about its axis at any time by slightly loosening collar 22 and after the desired adjustment has been effected the instrument is again secured by turning the collar tightly into position. This renders it possible to quickly and easily effect the desired adjustment of the instrument in such manner as to facilitate the use of the same without interference from the button 17 and associated parts, which is an important consideration in this art as above pointed out.

Preferably, though not necessarily, I provide a spiral guard 33 which is secured at its base about the upper end of the neck 26*a* of base member 26. This guard, in conjunction with the collar 32, serves to protect the patient from being burned by the instrument during use thereof.

I have illustrated and described an instrument which is adapted for use in connection with gutta-percha fillings and for similar purposes. It will be understood, however, that various other instruments may be used in connection with the switch handle, such as lights for examining the patient's teeth, a cautery, and other instruments. An important feature of my invention, as above pointed out, is proper contact between the terminal element 29 and the collar 10 at all times, which is of vital importance when using a light, a cautery, or other instruments which require to be continuously heated.

What I claim is:—

1. In a device of the character described, a hand piece provided at one end with a radially expandible and contractible neck, a radially expandible and contractible holding member within the neck adapted for reception of an instrument, and means for first contracting said member and subsequently contracting the neck about the holding member into gripping contact therewith.

2. In a device of the character described, a hand piece provided at one end with a neck, a holding member mounted in the neck and adapted for reception of an instrument, and means for first contracting said member into gripping contact with the instrument and for subsequently securing the holding member to the neck.

3. In a device of the character described, a hand piece, two members carried by the hand piece in concentric relation, the inner one of said members being adapted for reception of an instrument and being contractible, and means for first contracting said inner member and for subsequently locking both of said members together.

4. In a device of the character described, a hand piece, two contractible members carried by the hand piece in concentric relation, the inner one of said members being adapted for reception of an instrument, and means for contracting said members to lock them together and for first forcing the inner member into gripping contact about the instrument.

5. In a device of the character described, a hand piece provided at one end with a neck, a resilient split sleeve mounted in the neck and adapted for reception of an instrument, and a collar threaded onto the neck, the collar and the sleeve having cooperating means for con-

tracting the sleeve by threading the collar onto the neck into operative position.

6. In a device of the character described, a hand piece provided at one end with a neck, a resilient split sleeve mounted in the neck and adapted for reception of an instrument, and a collar threaded onto the neck, the collar and the sleeve and the neck having cooperating means for first contracting the sleeve and for subsequently locking the sleeve and the neck together by threading the collar onto the neck into operative position.

7. In a device of the character described, a hand piece provided at one end with a neck, a resilient split sleeve mounted in the neck and adapted for reception of an instrument, and a collar threaded onto the neck and provided at its outer end with an inner shoulder inclined outwardly of the collar radially thereof and toward the inner end of the collar, the neck being provided at its inner end with an inner shoulder inclined oppositely to the shoulder of the ring, said sleeve having end surfaces seating on said shoulders and cooperating therewith to contract the ring and lock the neck and ring together when the collar is threaded into operative position.

8. In a device of the character described, a hand piece provided at one end with a neck, a resilient split sleeve mounted in the neck and adapted for reception of an instrument, and a collar threaded onto the neck and provided at its outer end with an inner shoulder inclined outwardly of the collar radially thereof and toward the inner end of the collar, the neck being provided at its inner end with an inner shoulder inclined oppositely to the shoulder of the ring, said sleeve having end surfaces seating on said shoulders and disposed substantially parallel therewith providing contacting surfaces of appreciable area between the sleeve and the shoulders cooperating to contract the ring and to lock it to the neck when the collar is threaded into operative position upon the neck.

9. In a device of the character stated, a hand piece provided at one end with a neck, a resilient split sleeve mounted in the neck and adapted for reception of an instrument, and a collar threaded onto the neck, said neck being slotted to permit distortion thereof, the collar and the sleeve and the neck having cooperating surfaces coacting to first contract the sleeve into gripping contact with the instrument and to subsequently contract the neck into gripping contact with the sleeve when the collar is threaded into operative position upon the neck.

10. In a device of the character stated, a hand piece provided at one end with a neck, a resilient split sleeve mounted in the neck and adapted for reception of an instrument, and a collar threaded onto the neck, said neck having an L-shaped slot extending longitudinally and circumferentially thereof to permit distortion of the neck, the collar having an inclined surface disposed to contact with and contract the sleeve into gripping engagement with the instrument and to contact with and contract the neck into gripping engagement with the sleeve, when said collar is threaded into operative position upon the neck.

In witness whereof, I hereunto subscribe my name this 13th day of September, 1926.

OSCAR H. PIEPER.