April 25, 1944. J. L. GOTHERS 2,347,553

METHOD OF AND APPARATUS FOR PERFORMING DENTAL OPERATIONS

Filed Jan. 10, 1939

Fig. 3.

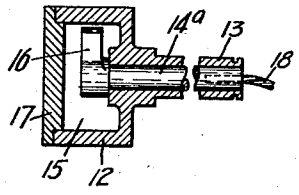


Fig. 1.

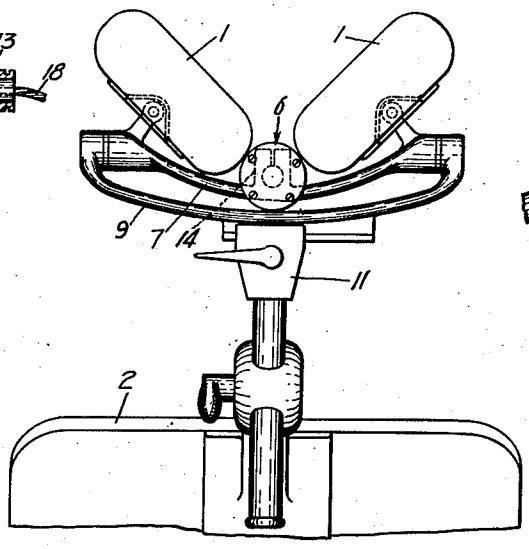


Fig. 5.

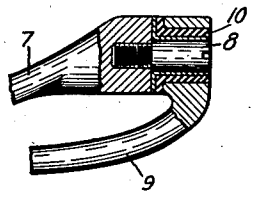


Fig. 4.

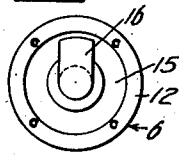
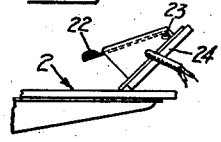


Fig. 6.



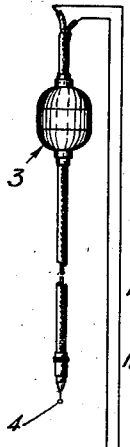


Fig. 8.

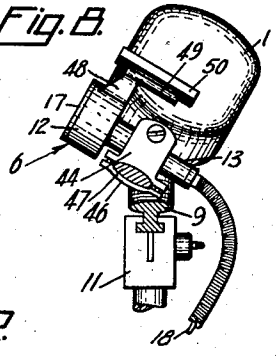
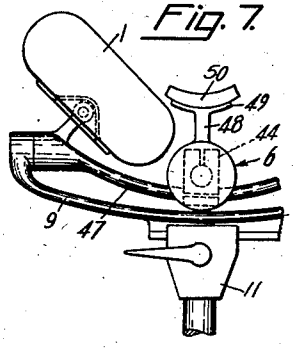


Fig. 7.



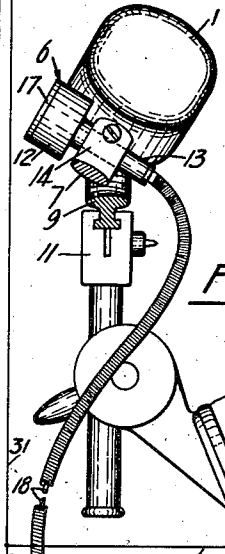
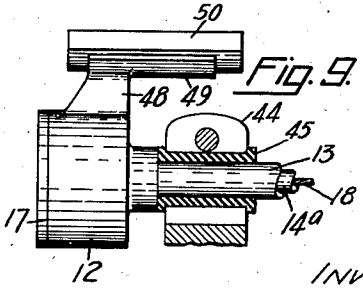
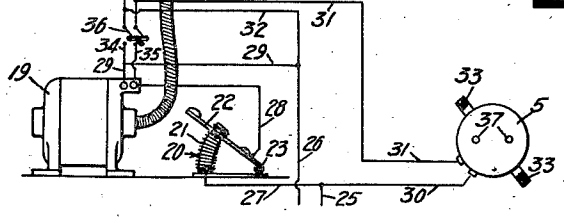


Fig. 2.

Fig. 9.





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METHOD OF AND APPARATUS FOR PERFORMING DENTAL OPERATIONS

John L. Gothers, Hartford, Conn.

Application January 10, 1939, Serial No. 250,191

16 Claims. (Cl. 128—33)

My invention relates to methods of and apparatus for performing dental operations.

It has long been recognized that dental operations, and particularly drilling, polishing or scraping operations, produce an exceedingly objectionable nervous reaction on the patient. This is true even when the operations are, in reality, painless, the patient nevertheless being under such nervous tension as to be definitely uncomfortable, and frequently frightened, all in such manner as to create a wholly unnecessary dread of dental work, while, of course, also increasing the difficulty of the dentist in performing such work. Obviously, these effects vary in intensity with different patients, ranging from patients who are so acutely sensitive thereto as to make it practically impossible for them to have dental work done, to those patients who are markedly less sensitive. Nevertheless, I find that in all cases, there is definite discomfort, due to the fact that most dental operations involve either the use of a drill, or a turning or scraping operation with a hand tool, or the performance of polishing, grinding, or other like operations on the teeth, and to the further fact that the teeth apparently immediately transmit the effects of the contact of the tool to the nerve centers of the brain.

My invention has for its object to eliminate these objectionable effects. A further object of my invention is to make it possible to do this without in any way interfering with the work of the dentist and while eliminating the need for preliminary treatment or medication, and while the dentist proceeds in normal course with the patient comfortable and relaxed. A still further object of my invention is to provide improved means whereby, as a result of vibrations artificially set up and controllable either by the patient or the dentist, it is possible, in effect, to erase from the patient's consciousness the vibrations incident to the contact of the tool with the teeth, and which, according to my observation, cause the objectionable effects previously mentioned. A still further object of my invention is to make it possible to vibrate the bony structure of the patient's head, and, more particularly, the occipital area thereof, during dental work, and in such manner as, by setting up new and artificial vibrations of unobjectionable frequency, to cause the average patient's nervous system to cease to react objectionably to contact with the dental tool while also exerting a sedative effect and, it is believed, through disassociation or exhaustion of the sensations through the nerve trunks and centers by the high frequency vibrations applied between the point of injury and the brain, blocking off or dulling the patient's consciousness of even actual pain. Still further objects of my invention are to produce an improved method of performing dental work while obtaining such new vibrations and whereby the above results are obtained, and further to provide improved apparatus operative while such work is being performed, and preferably continuously engaging the patient's head and under the control of the patient or the dentist, whereby the above results may be obtained. These and other objects and advantages of my improvements will, however, hereinafter more fully appear.

In the accompanying drawing, I have shown for purposes of illustration certain forms of apparatus which may be used in carrying out my improved method.

In the drawing—

Figure 1 is a rear elevation of the upper portion of a dental chair, including a headrest equipped with one form of my improvement;

Fig. 2 is a diagrammatic view of a complete installation, the headrest portion of the chair shown in Figure 1 being in side elevation, with one of the headrests broken away to facilitate illustration, and the circuit connections and vibrator controlling mechanism, as well as the drill and drill controlling mechanism being schematically illustrated;

Fig. 3 is an enlarged longitudinal section of the vibrator mechanism shown in Figure 1 between the headrests thereof;

Fig. 4 is an end elevation of the vibrator mechanism shown in Figure 3, the end casing thereof being removed to facilitate illustration;

Fig. 5 is an enlarged detail sectional view of one of the supports for the headrest and vibrator supporting yoke;

Fig. 6 is a detail side elevation of the foot rest of a dental chair equipped with one form of my improved vibrator controlling mechanism controllable by the patient;

Fig. 7 is a view similar to the upper portion of Figure 1 but showing a modified form of my improved vibrator mechanism adapted to be applied as an attachment to a standard chair, one of the headrests being broken away;

Fig. 8 is a view similar to the upper portion of Figure 2 showing the modified construction of Figure 7, and

Fig. 9 is an enlarged detail, partially in section, showing the support for the vibrator shown in Figure 8.

Referring first to the form of my invention shown in Figures 1 to 6, it will be noted that I have therein illustrated the same as associated with the usual laterally spaced headrests 1 of a dental chair 2 and adapted for use in connection with usual motor driven drilling equipment, generally indicated at 3, and including a drill 4 having its operation controlled by a usual drill rheostat 5 in a well-known manner; my improvements including an improved method of setting up counteracting vibrations in the occipital area of the patient's head during the drilling operation and improved apparatus for setting up such vibrations, all as hereinafter more fully described.

In this form of my improvement, my improved vibrating mechanism, generally indicated at 6, is disposed between the headrests 1 and carried upon the same yoke 7, herein in such position that the patient's head does not in any way come in contact with the vibrator mechanism 6. It will further be noted that this yoke 7, as usual supported on end studs 8 on a bottom yoke 9, is yieldingly mounted on suitable resilient, preferably rubber, bushing sleeves 10, in such manner that the vibration of the vibrating mechanism 6 is not transmitted beyond the yoke 7, i. e., cannot be communicated through the yoke 9 and its usual adjustable connection 11, to the chair 2.

Referring more particularly to the vibrating mechanism 6, it will be observed that the same herein is shown as comprising an elementary form of vibrating mechanism. This includes a casing 12 which is rigidly connected to the yoke 7 and herein also has a forwardly extending sleeve portion 13 clamped between upstanding clamps 14 intermediate the ends of the yoke 7 and integral therewith. Further, it will be observed that a vibrator shaft 14a is journalled in this sleeve 13 and has on its inner end, and within a chamber 15 in the casing 12, a laterally extending arm or end portion 16 constituting an eccentric and adapted, upon rotation, to produce vibration of the entire casing 12, as well as the yoke 7 and the headrests 1 carried thereon. Herein, the chamber 15 is normally closed by a cover 17 accessible from the back of the chair, as illustrated, and the sleeve 13 extends forwardly from the chamber 12 under the headrests, while the shaft 14a is connected at its front end through a suitable enclosed flexible shaft 18 to a motor 19 disposed in any suitable location on the chair or the floor adjacent the same.

Operatively associated with the vibrator motor 19 is improved controlling mechanism whereby the patient may control the operation of the vibrator 6 at will. Herein, these means include a rheostat, generally indicated at 20, and of a usual type in sewing machines, including a series of contacts 21 controlled by a cooperating contact carrying member 22, pivoted at 23, and suitably disposed on a portion of the chair conveniently accessible to the patient's foot or hand. Herein, the same is shown in Figure 6 as applied to a foot rest 24 on the chair 2. Thus, it will be evident that with the motor 19 suitably connected to the line conductors 25 and 26, current will flow from conductor 25 through a conductor 27 through the rheostat 20 and conductor 28 to the motor 19 and return through conductor 29 to the other line conductor 26. Consequently, the patient, when desiring to set the vibrator mechanism 6 in operation, moves the contact carrying member 22 down from the off position shown in Figure 2, by pressing down on the foot treadle 22 in such manner as to start the motor 19. Further, it will be evident that as the member 22 is pressed further down, successive sections of the rheostat will be cut out and the motor 19 will accordingly operate at higher speed in such manner as to increase the frequency of the vibrator mechanism 6 and thereby enable the patient to use the frequency which produces the best results.

Herein, improved controlling mechanism is also associated with the vibrator and the motor driven drill mechanism 3 so that when the patient does not desire to control the mechanism 6 by rheostat 22, the dentist may control the vibrator mechanism and have the same operate simultaneously with the drill mechanism 3. Herein, this mechanism for controlling the mechanism 3 is generally similar to that heretofore described for controlling the motor 19. As shown, a conductor 30 connects the line conductor 25 to drill rheostat 5 while the latter is connected to the motor of mechanism 3 by a conductor 31, and the mechanism 3 is connected to the other line conductor 26 by a conductor 32. Obviously, by adjusting the usual rheostat control members 33, the motor driven drill mechanism 3 may be started and have its speed controlled as desired in a usual manner. However, it will be noted that herein conductors 34, 35 are provided connecting the conductors 32 and 29 and 31 and 28 respectively, and that a double-pole knife switch 36 is provided in conductors 34, 35. Thus, when switch 36 is open, the drill mechanism may be operated independently by the dentist and while the patient is operating the motor 19, while when the patient does not wish to operate motor 19, i. e. by having the rheostat switch 20 open, the switch 36 is closed and both motors are controlled by the dentist as he operates the rheostat 5, the vibrator motor 19 and vibrating mechanism 6 thus being varied in speed as the speed of the drill mechanism is varied. Here, of course, it will also be understood that during the latter control by the dentist, with switch 36 closed and rheostat switch 20 open, the operation of the usual rheostat release buttons 37 on the drill rheostat 5 will stop the operation of the motor driven drill mechanism 3 and also stop the vibrator mechanism 6.

In the operation of my improved construction, the vibrator mechanism 6 operates upon both headrests 1 and causes a high frequency vibration to be applied to the bone structure in the general occipital area beneath which that posterior part of the brain and related nerve system having to do with sensation, is believed to be located, and where tests have shown that the effect of the vibration is most conducive to the comfort of the patient. In use, it is found that while the patient is conscious that work is being done in his mouth, the previously objectionable results thereof are quite completely eliminated, the rasping sensation and nerve tension, with the tendency to nervous chills previously experienced, being quite completely lacking. Further, it is found that the vibrations act as a sedative and further that they act to localize any sensation in the tooth or an area adjacent the same, previous aching sensations extending, for example, over large areas of the jaw or face, being in many cases quite completely absent. These results are also obtainable whether the vibrator

mechanism is under the manual control of the patient, or automatically operating with the drilling mechanism used by the dentist. However, with certain patients, it is found advantageous to let the patient control the vibrator mechanism as the patient is thus able to vary the frequency of vibration to meet the requirements of the particular work being done. This method of control also has added psychological advantages including that arising from diverting the patient's attention. In all cases, it will be understood that the frequency of the vibration is so high as not in any way to interfere with the work of the dentist, the head being, as far as the convenience of the dentist is concerned, as motionless as it is in the normal work of the dentist when a vibrator is not being used.

In the modified construction shown in Figures 7, 8 and 9, it will be observed that while the vibrator structure is essentially similar to that previously described and operated and controlled in like manner, the vibrator mechanism is adapted to engage directly with the head. Here it will be observed that a split clamping member 44 is provided for clamping a vibration absorbing rubber bushing 45 between the same and the sleeve 13 of the vibrator, while an additional bottom clamping member 46 is provided which clamps this member 44 to a standard headrest supporting yoke 47 on the chair. In this construction, it will also be observed that the casing 12 of the vibrator is provided with an extension 48 which extends upward between the headrests 1 and is provided with laterally extending flanges 49 supporting a sponge rubber or like vibrator pad 50. Thus, in this construction, neither the yoke 47 nor the headrests 1 are vibrated, while the vibrator 6 acts directly through the vibrator pad 50 on the occipital area. Obviously, this construction will function generally similarly to that heretofore described, while having the advantage of being capable of being provided as an attachment adapted to be readily applied to any standard dental chair.

In carrying out my improved method, it will be understood that I contemplate the vibration of the occipital area either as a preliminary to, or during the performance of dental operations in the mouth, and further contemplate the continuance of these vibrations, under the control of either the patient or the dentist, throughout such operations as otherwise would cause discomfort or pain to the patient. Further, it will be understood that the frequency of vibration used may vary within wide limits, the frequency varying in practice with the age of the patient, it being found that high frequencies are desirable for older patients, presumably in view of the changes in bone structure and advancing age. Further, it will be understood that the vibration is preferably of quite high frequency, as, for example, from 4000 to 5500 per minute, as from my tests I find that with the vibrator illustrated, frequencies within these limits are desirable to obtain good results.

While I have herein described my invention as applied to use in connection with dental work, and illustrated the same applied in various forms to a dental chair, it will be understood that I do not intend to limit the same to dental work, but instead contemplate the application of the same to other operative work where, through indirect or direct vibration of the occipital area of the skull during such operative work, it is possible to obtain approximations of my improved results.

Further, while I have herein specifically described my improved method as applied to use in connection with dental work and my improved apparatus as applied to a dental chair, it will be understood that the described embodiments of the same have been used for purposes of illustration, and that my invention may be modified and embodied in other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. Surgical apparatus comprising spaced head supports, and vibrator means including a vibrator and means operated thereby for vibrating said head supports and thereby applying high frequency percussive vibrations directly to the occipital area of the skull while the latter is supported on said supports.

2. Surgical apparatus comprising a head support, high frequency vibrating mechanism adapted to engage and percussively vibrate the occipital area of the patient's skull between portions of said support, a support carrying said head support and said vibrating mechanism, and means for confining the vibrations of said vibrating mechanism to said vibrating mechanism.

3. The method of relieving pain when operating with an instrument or tool on a living body which consists in, so blocking off the pain by suitable localized high frequency percussive vibrations applied through the bone structure of the body to a part of the nerve system between the point of injury and the brain as to remove the sensation of pain, and operating with the instrument or tool while continuing such vibrations.

4. The step of relieving pain when operating with an instrument or tool on a living body, which consists in, operating on a part of the body having its nerve system extending through the base of the skull while so percussively vibrating the bone structure in the area above the base of the skull at high frequency relative to the rest of the skull and body as to produce anesthesia in said part of the body being operated on.

5. The step of relieving pain when operating with an instrument or tool on a living body, which consists in, operating on a part of the body having its nerve system extending through the base of the skull while so subjecting the bone structure in the occipital area of the skull to localized high frequency percussive vibrations as to produce anesthesia in said part of the body being operated on.

6. The step of relieving pain when operating with an instrument or tool on a living body, which consists in, while operating on a part of the body having its nerve system extending through the base of the skull, so varying the frequency of high frequency percussive vibrations applied locally to the bone structure in the occipital area of the skull as to relieve the patient's sensitivity to pain as needed while the operation progresses.

7. The method of relieving pain when operating with an instrument or tool on a living body which consists in, applying localized high frequency percussive vibrations to the bone structure in the occipital area of the patient's skull, and performing the operation with the instrument or tool on a part of the body having its

nerve system extending through the base of the skull while continuing to vibrate said area to produce anesthesia in said part of the body being operated on.

8. The method of relieving pain when performing dental work which consists in, applying localized high frequency percussive vibrations to the bone structure in the occipital area of the patient's skull to relieve the sensitivity of the patient's tooth to vibratory tools applied thereto, and performing dental work on the patient's tooth with an instrument or tool vibrating the tooth while said high frequency vibrations continue.

9. Surgical apparatus for relieving pain while operating with an instrument or tool on a living body comprising means engageable with the occipital area of the patient's skull for localizing and concentrating the transmission of vibrations to said occipital area, and mechanism for producing a sedative effect during such an operation comprising mechanism for percussively vibrating said means at such high frequency as to produce high frequency vibrations of the bony structure of the occipital area of the skull while maintaining the head as a whole sufficiently free from vibration to permit the use of such an instrument or tool thereon.

10. Surgical apparatus for relieving pain while operating comprising spaced head supports conforming to the back of a patient's head and engaging opposite sides of the back of the head, and vibrator means for applying such localized high frequency percussive vibrations directly to the occipital area of the patient's skull between said supports as to relieve the pain while maintaining the head as a whole sufficiently free from vibration to permit the use of an operating instrument or tool thereon.

11. Surgical apparatus comprising a head support, and means for applying high frequency percussive vibrations to the occipital area of the skull while the latter is supported on said support and the remainder of the body is at rest, said support comprising laterally spaced supporting members adapted to engage said area and said vibrating means vibrating the head supporting area of said members.

12. Surgical apparatus for relieving pain during surgical operations comprising a surgical chair having a headrest, a mechanical vibrator for engaging and percussively vibrating a localized area of the patient's skull while the latter is supported on said headrest, and means for actuating said vibrator at such high frequency that the head as a whole remains so substantially motionless on said headrest as to permit the patient to be operated upon while said vibrations continue.

13. Surgical apparatus for relieving pain during surgical operations comprising a head support engaging the occipital area of the patient's skull, supporting means for said support, vibrator mechanism carried by said supporting means for percussively vibrating said head support, a chair carrying said supporting means, and means for maintaining the chair free from objectionable vibration during operation of said vibrator mechanism.

14. Surgical apparatus comprising high frequency vibrating mechanism for percussively vibrating the occipital area of a patient's skull while operating on the patient's teeth including an actuating motor, a motor driven operating tool adapted to set up vibrations, and motor circuit controlling means controlling the circuits of both motors for controlling both the speed of said operating tool and the frequency of said vibrating mechanism to simultaneously vary the frequency of the latter as the speed of said tool is varied.

15. Surgical apparatus comprising high frequency vibrating mechanism for percussively vibrating the occipital area of a patient's skull while operating on the patient's teeth including an actuating motor, a motor driven operating tool adapted to set up vibrations, motor circuit controlling means controlling the speed of said operating tool, and motor circuit controlling means for varying the frequency of said vibrating mechanism independently of the operation of said operating tool to enable the frequency of said vibrating mechanism to be varied as the speed of said tool varies.

16. Surgical apparatus comprising high frequency vibrating mechanism for percussively vibrating the occipital area of a patient's skull while operating on the patient's teeth including an actuating motor, a motor driven operating tool adapted to set up vibrations, motor circuit controlling means operable by the surgeon for controlling the speed of said motors to vary the frequency of said vibrating mechanism and simultaneously vary the operating speed of said tool, means operable by the patient for varying the frequency of said vibrating mechanism to vary the frequency of the latter as the speed of said tool varies, and means for selectively connecting said vibrating mechanism for control either by the surgeon or the patient.

JOHN L. GOTHERS.