Dec. 18, 1928. 1,695,773

W. C. MORGAN

ATTACHMENT FOR DENTAL ENGINE HANDPIECES

Filed Jan. 19, 1926

Fig. 1.

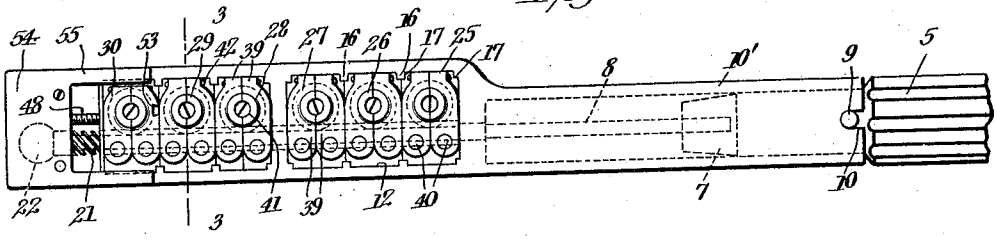
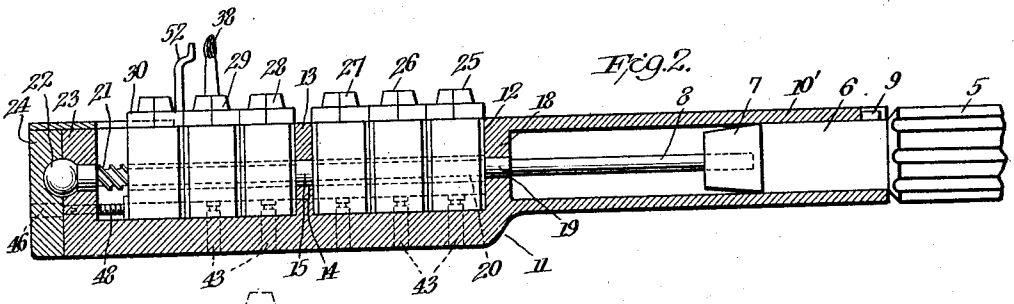


Fig. 2.



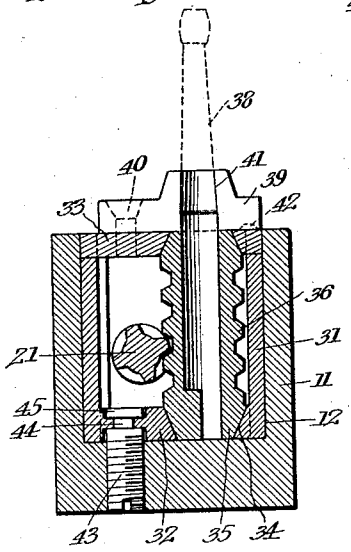


Fig. 3.

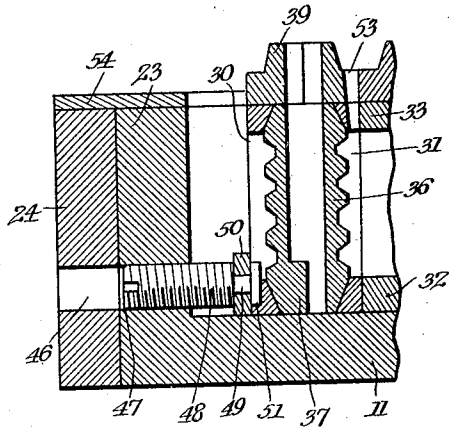


Fig. 4.

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UNITED STATES PATENT OFFICE.

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ATTACHMENT FOR DENTAL ENGINE HANDPIECES.

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This invention relates to new and useful improvements in attachments for dental engine hand-pieces, and more particularly to the type wherein more than one bur or drill can be used simultaneously.

An important object of the invention resides in the provision of the device of this character by which two or more parallel cavities of the same or different depths may be simultaneously formed. The invention also contemplates the use of a guide which may be used in conjunction with one or more drills whereby one or more cavities can be formed parallel to a cavity which has already been formed.

Another important object of the invention resides in the provision of an attachment for dental engine hand-pieces which is provided with a plurality of juxtaposed tool holders arranged at predetermined points whereby tools may be associated with certain of the holders so that the tools may be arranged the desired distance apart. In this manner, parallel cavities may be formed at different distances between centers by merely associating the tools with the proper tool holders.

A still further object of the invention is to provide an attachment of the above character including a support or handle in which is mounted a pair of tool carriers, one of which is adjustable transversely of the attachment for regulating the working depth of the tool associated therewith, while the other carrier is adjustable longitudinally of the attachment whereby the proper distance between the tools may be attained. With this arrangement, it is not necessary to employ two tools, but the guide element may be associated with one of the carriers and projected into a formed cavity in order to guide the tool of the other carrier parallel to a wall of the formed cavity.

Still another object of the invention resides in the arrangement and construction of the support, tool carriers and drive means whereby the parts are held firmly against any tendency to wobble thereby resulting in a non-vibrating, smooth operating attachment.

Another object of the invention is to provide each tool holder with means for receiving and holding a standard bur or drill in such a manner that the drill can be quickly and easily associated with its holder and likewise may be quickly detached therefrom when desired.

Still another object of the invention is to provide an attachment of the above character equipped with means of such construction that the attachment can be rapidly and easily connected to the usual dental engine handpiece so as to simultaneously couple with its drive means, the drive means of the attachment.

Other objects and advantages of the invention will become apparent to those skilled in the art as the detail description of the drawing proceeds.

In the drawings wherein for the purposes of illustrating, I have disclosed the embodiment of the invention, which is at present preferable, and have employed like numerals to designate like parts throughout the views:

Figure 1 is a top plan view of the attachment shown coupled with a dental engine-hand piece.

Figure 2 is a longitudinal section taken through the same.

Figure 3 is an enlarged transverse section taken through the attachment on the line 3—3 of Figure 1, and

Figure 4 is an enlarged fragmentary longitudinal section through the outer end of the attachment illustrating in detail the means provided for by adjusting one of the tool carriers longitudinally of the support.

Referring now in detail to the drawing, the numeral 5 designates the end of a usual dental engine hand-piece which terminates in a smooth cylindrical reduced portion 6 having a tapered terminal 7. This end of the ordinary hand-piece slips into one end of my attachment and the drive shaft 8 thereof is coupled with the driving means of the hand-piece in a manner well understood by those versed in the art. The reduced portion 6 of the hand piece is provided with an exterior stud 9 which is adapted for reception in the notch 10 provided in the inner tubular handle portion 10′ of the attachment when the attachment is slipped on to the hand-piece.

This tubular portion 10′ forms the inner end of my attachment and what I have termed a support for a plurality of tool holders and is designated in its entirety by the numeral 11. The outer portion of this elongated support may be of substantially rectangular cross section, or of any other shape that may be found desirable. It is provided with an elongated recess 12 of substantially rectangular shape, and this recess opens out into one face of the support as clearly shown. The recess

is divided substantially in half by a transverse partition 13 having an opening 14 transversely thereof to provide a bearing for the intermediate portion 15 of the drive shaft 8. The side walls of the recess 12 on each side of the partition 13 are provided with a plurality of parallel guide ribs 16 which are designed to engage in the recessed corners 17 of all of the tool carrying units, which will be presently described, with the exception of the outermost unit which does not engage with guide ribs 16 at its outermost two corners for the reason that this end unit is adapted for longitudinal adjustment of the attachment.

A dividing wall 18 separates the outer end of the tubular handle portion 10 from the recess 12 and provides a bearing for a slightly enlarged portion 19 of the drive shaft 8. Between the bearings 15 and 19, the drive shaft 8 is provided with a worm 20 which extends through the hollow tool carrying units placed between the partition 13 and wall 18, it being shown in the present illustration as associated with three of such units, although I desire it to be expressly understood that I do not limit the invention to the number of units provided. The worm 20 is slightly larger than the portion 19 of the drive shaft to provide a shoulder adapted to abut the outer surface of the wall 18 in order to limit inward movement of the drive shaft.

The drive shaft 8 is extended beyond the bearing portion 15 thereof and through the other set of three tool carrying units disposed beyond the partition 13, it being observed that a worm 21 is likewise provided upon the extended portion of the shaft to project through these units for propelling the tool holders thereof as will be explained in detail presently. The outer end of the drive shaft terminates in a globular enlargement 22 having bearing in a corresponding recess formed between the end wall 23 of the support and a removable end plate 24 fastened to the end of the support in such a manner that it may be removed when inserting the drive shaft into the attachment, or for the purpose of facilitating removal of this shaft in the event of repairs thereto or to other parts being necessary.

In the present illustration I have shown three tool carrying units associated with the recess 12 on each side of the partition 13, these units being numbered 25 to 30 inclusive. Each of these tool carriers comprises a substantially rectangular hollow housing 31, and all of them except the unit 30 has its longitudinal corners provided with recesses 17 to fit the guide ribs 16 provided on the walls of the recesses 12 to facilitate adjustment of the units. The two inner corners of the unit 30 are, however, equipped with similar grooves 17, in order that this unit may be slid up close to the adjacent unit 29 when such adjustment is desirable.

The bottom 32 and the removable top 33 of each tool carrier are provided with aligned outwardly tapering openings 34 to form bearings for similarly shaped ends 35 of an open ended tubular worm 36 which constitutes the tool holder. In this manner, it will be appreciated that the worm 36 of each carrier unit 31 is freely rotatably mounted and since the worms 20 and 21 of the drive shaft are meshed with these worm tool holders, it will be appreciated that they are driven from a common shaft. The end of each worm adjacent the bottom of the recess 12 is provided with a semi-circular extension 37 which projects into the tool receiving bore of the worm to fit a similarly shaped notch in the inner end of a drill shank 38 shown in dotted lines in Figure 3. Of course, it will be appreciated that the inner end of the bore of each worm 36 may be formed in any manner to equip it with a non circular portion at this point so as to prevent relative rotation between it and the shank of the drill inserted therein.

In order that the drills may not become accidentally displaced from their respective tool holders 36, I provide movable means adapted to engage about the shanks of the drills. This means in the present illustration, although it is to be understood that I do not consider the invention limited to this specific type of means, consists of a pair of pivoted jaws 39 connected to the top of each tool carrier 31 by means of screws 40 or other suitable fastenings passing through the jaws and the removable top 33 of the carrier. Each pair of jaws 39 are equipped with complementary tapered recesses 41 to engage about the usual tapered portion of the standard drill or bur in order to prevent accidental outward movement of the drill when associated with its holder. In order that these jaws may be securely retained about their respective drills in closed position, I provide the top of each carrier unit with a pair of upwardly projecting semi-circular beads 42, shown most clearly in dotted lines in Figure 3, and adapted to be received into corresponding recesses in the under sides of the free ends of the jaws 39. By slight pressure tending to separate the free ends of the jaws 39, they may be swung free of the retaining beads 42 to release the drill, and vice versa to retain the drill in its carrier.

To facilitate the easy sliding adjustment of the unit 30 and assist in obviating vibration thereof when in operation, I provide a guide 54 consisting of a plate screwed on top of the end wall 23 and provided with a pair of inwardly projecting spaced parallel guide arms 55 which rest upon the side walls of the recesses 12 adjacent its outer end. It will be observed that these arms 55 slightly overlap the top of the carrier unit 30, the jaws 39 of which are made short enough to permit this relationship. When the jaws 39 of this

unit are to be opened, the unit is moved away from the adjacent unit 29 sufficiently to permit opening of the jaws.

To enable the drill carriers 25 to 29 inclusive to be adjusted transversely of the support 11 for the purpose of either permitting the jaws 39 to swing free of adjacent units, or to adjust the drills axially whereby the drills may operate to different depths, I provide rotatable adjusting means for each unit or carrier 31. This rotatable adjusting means for moving each drill carrier independently of the other transversely of the support, consists, in the present instance, of merely a screw 43 threaded through the bottom of the support 11 under its respective carrier. Each of these screws 43 is provided with a reduced neck 44 adapted to project through the bottom 32 of its respective carrier 31 and is swivelly connected thereto by means of fastening a removable head 45 to the free end of the neck 45 in any suitable manner. It will therefore be seen that by turning the screw 43 of any tool carrying unit 31 so as to move the same inwardly of the support or casing 11, that that particular carrier will be moved transversely and outwardly of the support.

Similar adjusting means are provided for adjusting the outermost carrying unit 30 longitudinally of the support or attachment, and instead of the screw being threaded through the bottom of the support, it is extended through an aperture 46 of the removable end plate 24 aligned with a threaded aperture 47 of the end wall 23 of the support. The inner end of this screw is, like the screws 43, provided with a reduced neck 49 adapted to project through a removable plate 50 of the end carrier 30 and terminates in an enlarged head 51 for swivelly connecting the screw 48 to the carrier unit 30. By unscrewing the screw 48, the carrier unit 30 will be moved outwardly and longitudinally of the support or attachment, and reverse rotation of the screw will reverse movement of this carrier in order that the distance between the drills carried by the units 29 and 30 may be varied as desired. Thus, it will be apparent that the carrier units 29 and 30 can be moved in non-parallel planes or at right angles to each other, in order to vary the distance between the tools carried by these units or to vary the working depth of the tool carried by the unit 29 when it is moved transversely of the attachment. All of these screws 43 and 48 are of the machine screw type, and an ordinary screw driver may be employed for turning them. As I do not restrict the invention to this particular type of adjusting means, it will be understood that any means for moving the units in the directions indicated will serve equally as well.

When the distance between the cavities to be formed is less than the minimum space between the drills of the carrier units 29 and 30, I have provided a removable guide prong 52 formed with an elongated shank adapted to fit the dovetail groove 53 provided in the side of the carrier unit 30 which is adjacent the unit 29. Since the jaw 39 of the unit overlaps this groove, it, also is provided with a dove-tail recess, as shown best in Figure 1, to align with the groove. The outer end of this guide prong 52 may be offset, as shown, so that cavities closely together may be drilled parallel, or this end may be aligned with the body of the prong when it is desired that the cavities be drilled further apart than would be permissible with the arrangement shown in Figure 2. If desired, a set of guide prongs 52 of different configurations may be supplied with the attachment in order that the desired distance between cavities, which is less than the distance between the drills of adjacent carrier units, may be formed with equal facility.

With drills 38 positioned in the drill holding worms 36 of the units 29 and 30, and it be desired to drill cavities spaced further apart then the drills are arranged, the screw 48 may simply be turned to move the unit 30 with its drill away from the unit 29 until the desired distance between the drills has been attained. Should it be desired to drill cavities spaced further apart then the adjustment of the unit 30 will permit, it will be appreciated that a drill may be associated with any of the units 25 to 29 inclusive, so that the desired distance between the drills of these units and that of the unit 30 will be attained. In the event of it being desired to drill one cavity to a greater depth than another simultaneously, any of the units 25 to 29 inclusive may be adjusted inwardly or outwardly transversely of the attachment by simply turning the screw 43 associated with the unit to be adjusted. As these are merely a few of the uses of the attachment to divulge the utility of the various constructions and arrangements, it will, of course, be obvious to those skilled in the dental art that many other uses of the attachment are possible and which are not believed to be necessary to set forth in detail.

It is to be understood that I do not restrict the invention to the size, shape or arrangement of the parts as disclosed herein for the purpose of illustration, but that various changes in the construction and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the claims appended.

I claim:

1. A dental engine hand-piece comprising a support, a tool carrier adjustably mounted therein, means in said support for rotating the tool, and means for adjusting the carrier to move the tool axially within said support.

2. A dental engine hand-piece comprising

a support, a tool carrier adjustably mounted therein, said tool carrier including a worm, a worm shaft meshing with said worm, and means in said support for adjusting the carrier to move the tool axially.

3. A dental engine hand-piece comprising a support, a tool carrier adjustably mounted therein, means in said support for rotating the tool, and rotatable means extending through the support for moving the carrier.

4. A dental engine hand-piece comprising a support, a tool carrier, a tool holder rotatably mounted therein and having spiral threads, a worm shaft meshing with said threads, and means for adjusting the carrier within said support to move the tool axially.

5. An attachment for dental engine hand-pieces comprising a support, a tool carrier associated therewith and capable of rectilinear adjustment relative thereto, a tool holder mounted in said carrier, and means for rotating said tool holder.

6. A dental engine hand piece comprising a support, a pair of tool holders associated therewith and movable at substantially right angles to each other to vary the distance therebetween and the working depth of tools adapted to be mounted in said holders, and means carried by said support for rotating said tool holders.

7. A dental engine hand piece comprising a support, and a pair of tool holders associated therewith and movable in non-parallel planes, and means carried by said support for rotating said tool holders.

8. An attachment for dental engine hand-pieces comprising a support, a pair of tool carriers adjustably connected thereto, means for driving the tools, one of said carriers being adjustable longitudinally of the support and the other carrier being adjustable transversely thereof, the movement of both carriers being in rectilinear paths.

9. An attachment for dental engine hand-pieces comprising a recessed support, a pair of tool carriers adjustably mounted therein, means for rotating the tools, rotatable means extending through a side of the support for adjusting one of said carriers transversely thereof, and rotatable means extending through the end of said support for adjusting the other carrier longitudinally thereof.

10. An attachment for dental engine hand-pieces comprising a recessed support, a pair of tool carriers adjustably mounted therein, means for rotating the tools, rotatable means extending through a side of the support for adjusting one of said carriers transversely thereof, and rotatable means extending through the end of said support for adjusting the other carrier longitudinally thereof, and a guide member associated with one of said carriers.

11. A dental engine hand-piece comprising a support, a pair of tool carriers adjustably connected thereto, a rotatable holder in each carrier, means for rotating said holders and a guide associated with one of said carriers adapted to enter a cavity and guide a tool of the other carrier parallel thereto.

12. An attachment for dental engine hand-pieces comprising a support, a pair of tool carriers adjustably connected thereto, a rotary driven holder in each carrier and a guide associated with one of said carriers for guiding a tool of the other carrier to the desired depth and in the desired direction.

13. An attachment for dental engine hand pieces comprising a support, more than two relatively fixed juxtaposed tool holders carried thereby and arranged at predetermined points whereby tools can be associated with selected holders to dispose the tools any desired distance apart, and means for rotating said tool holders.

14. An attachment for dental engine hand-pieces comprising a support, and a plurality of juxtaposed tool carriers in fixed relation longitudinally of the support and adjustable laterally thereof.

15. An attachment for dental engine hand-pieces comprising a support, a plurality of juxtaposed tool carriers rectilinearly movable, a tool holder rotatably mounted in each carrier, and common drive means for said tool holders mounted in said support.

16. A dental engine hand-piece comprising an elongated support, a plurality of juxtaposed tool carriers associated therewith in alignment longitudinally of said support, a rotatable tool holder mounted in each carrier, and common drive means for said tool holders extending through the same and longitudinally of the support.

17. A dental engine hand-piece comprising a support having a recess therein provided with guide ribs, a tool carrier slidably engaging said ribs, and an adjusting screw mounted in said support and connected to said tool carrier to adjust the latter and prevent accidental displacement thereof.

18. A dental engine hand-piece comprising an elongated support, a plurality of juxtaposed tool carriers adjustably associated therewith in alignment longitudinally of said support, a driven tool holder rotatably mounted in each carrier, and a common drive shaft extending through the carriers and longitudinally of said support for rotating said holders.

19. An attachment for dental engine hand-pieces comprising an elongated support, a plurality of juxtaposed tool carriers adjustably mounted in said support, one of said carriers being rectilinearly adjustable longitudinally of said support, and the other carrier transversely thereof, a driven tool holder rotatably mounted in each carrier, and drive means common to all of said carriers for rotating the tool holders.

20. An attachment for dental engine hand-pieces comprising a support, a plurality of tool carriers rectilinearly movable transversely of said support, a single tool carrier rectilinearly movable longitudinally of said support and provided with means for holding a guide adapted to cooperate with any one of the tool carriers.

21. An attachment for dental engine hand-pieces comprising a support, more than two juxtaposed tool carriers arranged in fixed relation with respect to the longitudinal dimension of the support, and guide means adapted for cooperation with any of said tool carriers in which a tool or tools may be placed.

22. An attachment for dental engine hand-pieces comprising an elongated support, a plurality of juxtaposed tool carriers associated with said support lengthwise thereof and being immovable lengthwise of the support, a rotary driven tool holder associated with each carrier, and means common to all of said tool holders for rotating the same.

23. A dental engine hand-piece comprising a support, a tool carrier mounted therein, a rotatable tool holder mounted in said carrier, a burr mounted in said holder and having a portion of its shank tapered, and a pair of pivoted jaws having tapered jaw faces adapted to engage about the tapered portion of the shank of said burr for detachably retaining it in said holder.

In testimony whereof I have hereunto set my hand.

WILLIAM C. MORGAN.