Sept. 29, 1953 S. KAY 2,653,385

DENTAL PARALLELING APPARATUS

Filed Sept. 16, 1952

FIG. 1.

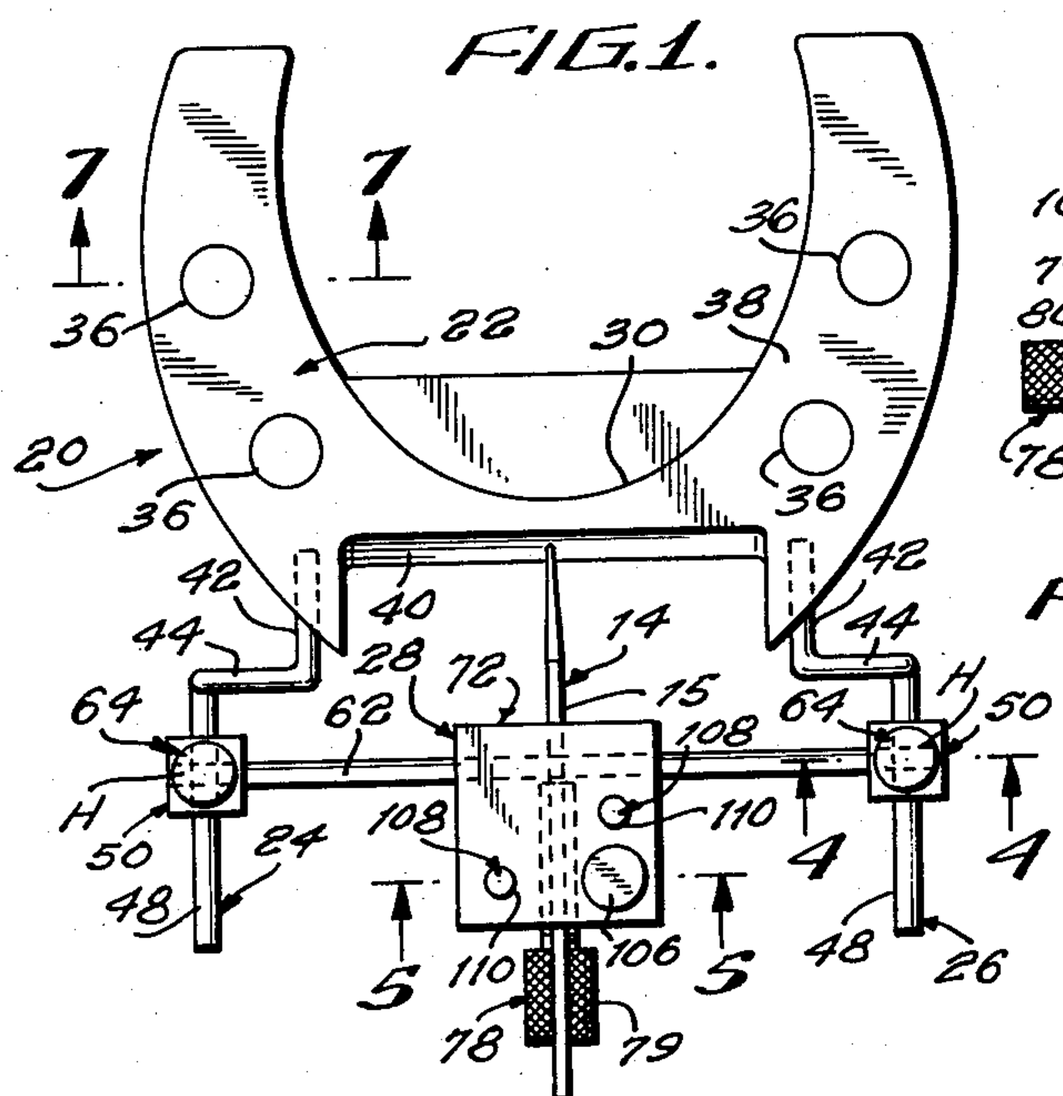
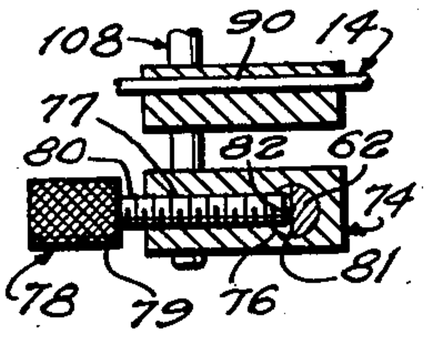



FIG. 6.



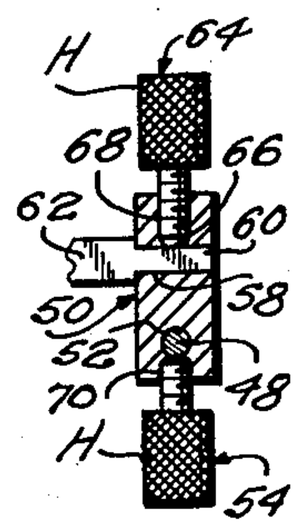




FIG. 4.

FIG. 5.

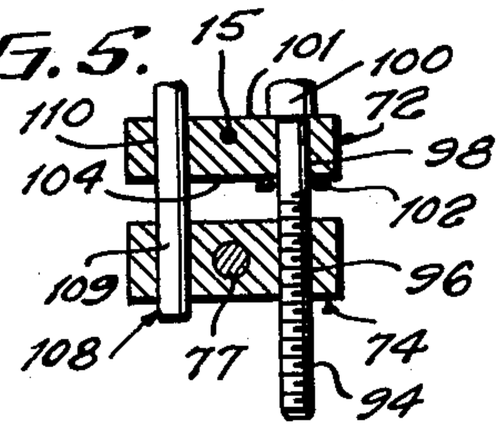



FIG. 8.

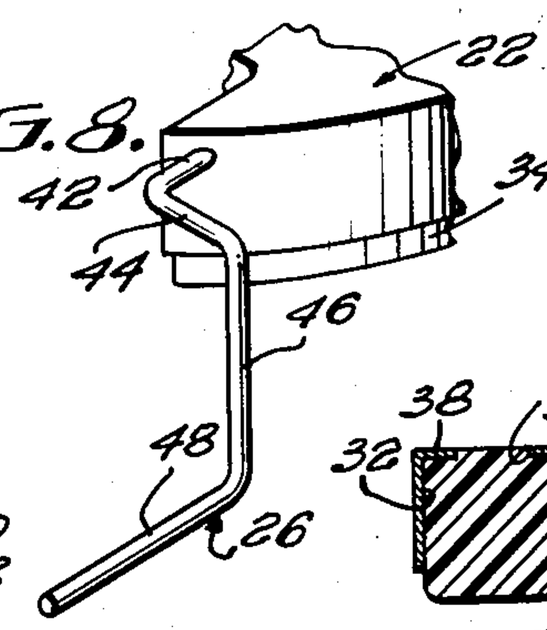



FIG. 7.

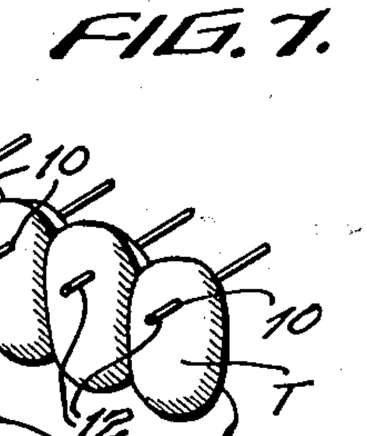



FIG. 2.

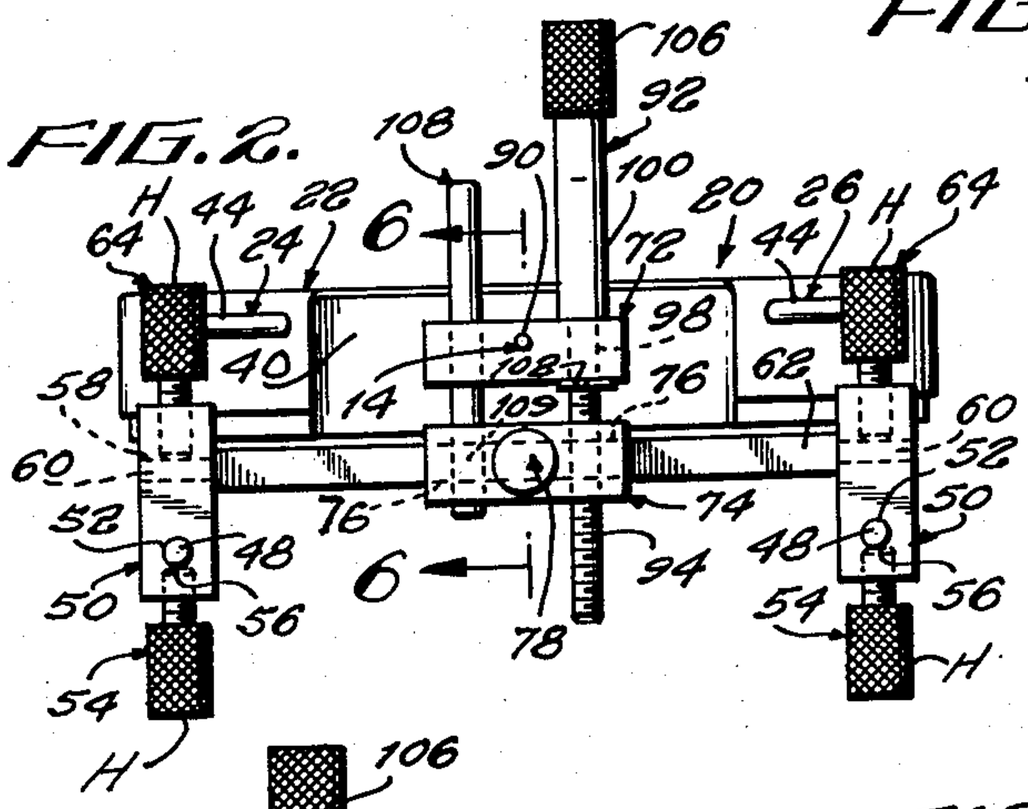



FIG. 9.



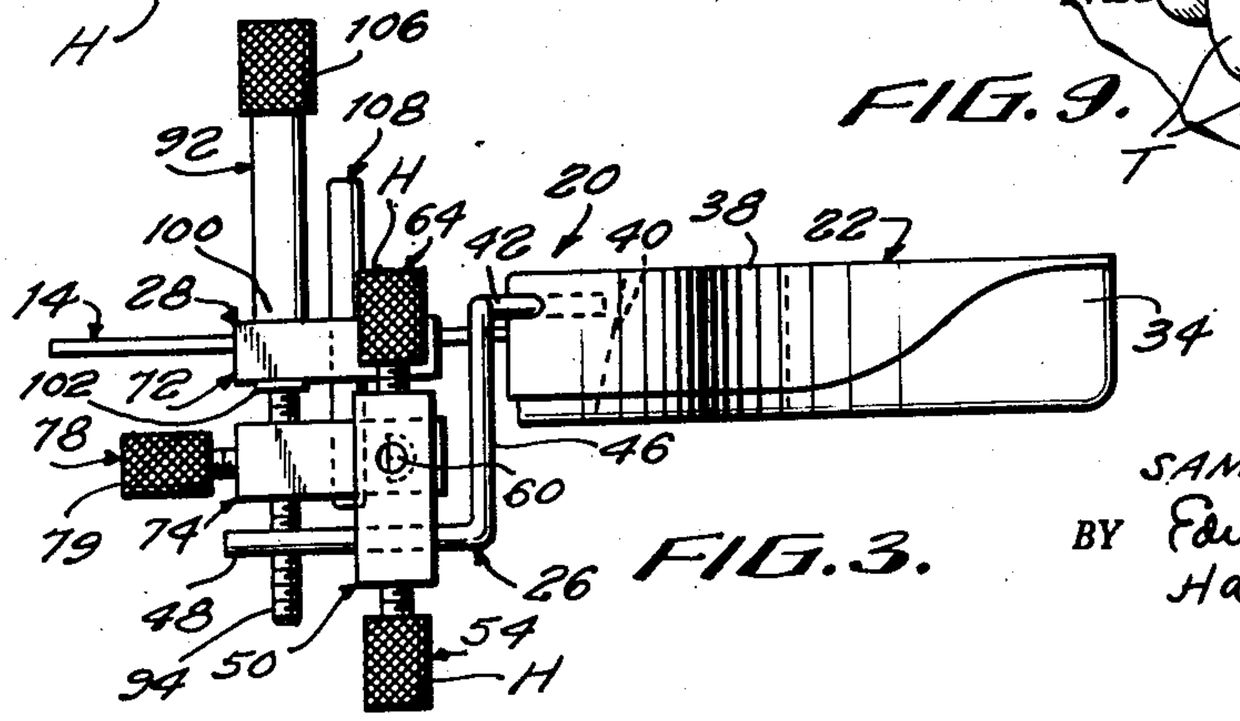




FIG. 3.

INVENTOR.
SAMUEL KAY
BY Edwin Lieberman &
Harry Cohen
ATTORNEYS

Patented Sept. 29, 1953

2,653,385

# UNITED STATES PATENT OFFICE

2,653,385

## DENTAL PARALLELING APPARATUS

Samuel Kay, New York, N. Y.

Application September 16, 1952, Serial No. 309,792

14 Claims. (Cl. 32—67)

1

This invention relates to improvements in dental apparatus generally, and more particularly to improvements in apparatus for the parallel guidance of dental tools.

One of the basic techniques for supporting weak teeth and for tooth restoration and the like is a splinting technique in which a group of adjacent or spaced anterior teeth must have holes drilled therethrough in a predetermined arrangement for the reception of pins which are adapted to support a bridge, brace or similar denture. The parallelism and alignment of such holes is critical in order to align and parallelize the pins supported in such holes for taking impressions and subsequent related operations involved in making the denture.

It is accordingly the primary aim and object of the present invention to provide apparatus for the parallel guidance of dental tools for drilling aligned and parallel holes into and through the patient's teeth.

It is another object of the present invention to provide in apparatus of the above character, a movable and universally adjustable carriage for the parallel guidance of dental tools which is mounted without the patient's mouth.

It is another important object of the present invention to provide an improved support for apparatus of the above character, said support being adapted to be frictionally engaged to the patient's teeth.

It is yet another object of the present invention to provide apparatus of the above character which is of simple and durable construction, highly efficient and accurate in operation, and comfortable in use to both the patient and dentist alike.

The above and other objects, features and advantages of the present invention will be more fully understood from the following description considered in connection with the accompanying illustrative drawings.

In the drawings:

Fig. 1 is a top plan view of the apparatus according to the present invention;

Fig. 2 is a front elevational view thereof;

Fig. 3 is a side elevational view thereof;

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 1;

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 1;

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 2;

Fig. 7 is a sectional view taken on the line 7—7 of Fig. 1;

2

Fig. 8 is a fragmentary perspective view of part of the support of the apparatus; and

Fig. 9 is a fragmentary perspective view of a group of lower anterior teeth having pins inserted therethrough.

Referring to the drawings and more particularly to Fig. 9 thereof, there is shown a group of lower anterior teeth T having holes 10 drilled therethrough in a predetermined arrangement for the reception of pins 12 which are adapted to support a denture for restoring or reenforcing one or more teeth T. The parallelism and horizontal alignment of holes 10 is critical and the drilling must be accurately performed in order to provide for the alignment and parallelization of pins 12 positioned in holes 10 for taking impressions and performing the subsequent operations involved in making the denture. The apparatus 20, to be fully described hereinafter, is adapted for the parallel guidance of any of the conventional dental tools utilized for drilling holes 10, for example the dental drill 14 shown in Fig. 1. It will be noted that the apparatus 20 is adapted to guide and support the dental drill 14 for parallel movement in a generally horizontal plane whereby drill 14 may drill aligned and parallel holes 10 into and through the patient's teeth T.

The apparatus 20 comprises a support 22, having a pair of supporting arms 24 and 26 projecting forwardly thereof, said supporting arms being adapted to support the carriage 28 which will be described in detail hereinafter. The support 22 comprises a generally horse-shoe shaped frame 30 which defines a receptacle 32 which is adapted to contain any suitable compound 34 for frictionally engaging a patient's teeth. The horse-shoe frame 30 is of conventional construction except in the respects which will be noted below and said frame may be provided with the usual apertures 36 in the face 38 thereof. It will be understood that the compound 34 may be a conventional dental modeling compound and is adapted to be pressed against the patient's teeth to provide a firm frictional engagement for maintaining the support 30 in a fixed position relative to the patient's mouth. The support 30 has a cut-away portion 40 at the forward part thereof to provide adequate clearance for the dental drill 14 for its full range of movement, as will subsequently be described. The cut-away portion 40 and the supporting arms 24 and 26 are features of the inventive concept herein shown and described whereas the remainder of the horse-shoe frame 30 is of conventional construction. The support-

ing arms 24 and 26 are secured to the frame 30 in laterally spaced relation in any conventional manner, as by means of soldering and the like. Each of the supporting arms 24 and 26 is structurally identical and has an outwardly projecting portion 42, a laterally projecting portion 44, and a downwardly projecting portion 46 whereby the end portions 48 of the arms 24 and 26 will be spaced laterally outwardly and downwardly of the arm portions 42 for a purpose which will be evident from the description which follows. It will be understood that the supporting arms 24 and 26 may be of any desired construction and configuration whereby to provide for the requisite movable support and proper positioning of the carriage 28.

Each of the supporting arms 24 and 26 has mounted thereon a supporting member 50, said member being apertured at 52 for the reception of the end portion 48 of its associated supporting arm. Each of the supporting members 50 is adjustable longitudinally of its associated supporting arm and may be clamped in its adjusted position by means of the clamping screw 54 which has an end portion 56 which is adapted to bear against peripheral portions of its associated supporting arm. The pair of supporting members 50 are adapted to move in unison towards and away from the support 22 for concomitantly moving the carriage 28 towards and away from support 22 in a manner to be described in detail hereinafter. Each of the members 50 is transversely apertured therethrough as indicated at 58 for receiving an associated end portion 60 of the transverse bar 62. The transverse bar 62 is adapted to be rotated about its longitudinal axis for concomitantly rotating its associated carriage 28 about said axis and the end portions 60 of said transverse bar are adapted to be clamped in adjusted position by means of clamping screws 64 threadedly associated with the members 50. It will be noted that each of the clamping screws 64 has an end portion 66 which is adapted to bear against a peripheral portion of the end portions 60 of bar 62 for maintaining the latter in firmly clamped position. It will be understood that each of the members 50 is provided with threaded apertures 68 and 70 for receiving the clamping screws 64 and 54, respectively, and that said clamping screws may be provided with knurled handles as indicated at H for convenience in manually manipulating said clamping screws. The transverse bar 62 is preferably of half-round cross section as indicated in Fig. 6 and said bar is adapted to movably mount the carriage 28 in a manner now to be described.

The carriage 28 comprises a pair of vertically spaced parts or blocks 72 and 74, the block 72 being vertically reciprocable relative to the block 74, with the latter block being apertured as indicated at 76 for the through reception of the transverse bar 62. The block 74 is apertured as indicated at 77 for the reception of the clamping screw 78, said clamping screw having a threaded shaft portion 80. The aperture 77 is threaded complementary to said threaded shaft portion and screw 78 is provided with a knurled handle portion 79. In the normal operation and application of the instant apparatus the transverse bar 62 and the block 74 are locked against relative rotation and for this purpose said transverse bar is preferably formed of half-round stock whereby the end portion 82 of the clamping screw 78 may bear against the flat side 81 of



the bar 62, as shown in Fig. 6, for firmly clamping the block 74 to said transverse bar. For adjusting the block 74 of the carriage 28 about the longitudinal axis of the bar 62 it is merely necessary to unclamp the end portions 60 of said bar by unclamping the clamping screws 64 whereby said carriage may be rotated about said axis as will be readily apparent. The block 72, which is vertically reciprocable relative to the block 74, is apertured therethrough as indicated at 90 for the reception of the dental drill 14 for supporting and guiding the latter. The longitudinal axis of the aperture 90 is substantially perpendicular to the longitudinal axis of the bar 62 and this relationship is maintained in all adjusted positions of the carriage 28. It will be understood that the aperture 90 and the body portion 15 of the dental drill 14 are dimensioned complementary whereby said drill may be moved axially but will be restrained against any substantial lateral movement.

In order to provide for the adjustment of the block 72 in a generally vertical plane concomitantly adjusting a dental tool or drill 14 associated therewith, there is provided an adjusting screw 92 having a threaded shaft 94 which is adapted to be received in, and extend through, the complementary threaded aperture 96 of the block 74. The block 72 is apertured therethrough as indicated at 98, the latter being in axial alignment with the threaded aperture 96 of the companion block member 74. The adjusting screw 92 has an enlarged shaft portion 100 abutting the face 101 of block 72 and has a fixed washer or retainer ring 102 in abutting relation with the face 104 of said block, the shaft portion 100 and the fixed washer 102 being adapted to restrain the adjusting screw 92 against axial movement relative to the block 72. It will be apparent from the above that the rotation of adjusting screw 92 will be effective to vertically adjust the block 72 relative to its companion block 74 and the direction of movement will correspond to the direction of rotation of said adjusting screw. The adjusting screw 92 is further provided with a knurled handle 106 to facilitate the manual rotation of said adjusting screw. In order to guide the block 72 for vertical reciprocation there is provided a pair of guide studs 108 which have their end portions 109 secured to the block 74 in any desired manner. The vertically movable block 72 is apertured therethrough as indicated at 110 for the reception of the studs 108, it being understood that the block 72 is adapted for movement axially of said fixed studs. Thus each of the studs 108 is in fixed relation relative to the block 74 but is received in the apertures 110 of the block 72 with sufficient clearance to provide for relative movement between such block and the studs 108 during the reciprocation of said block. Thus the dental drill 14 is adapted to be vertically adjusted by means of the adjusting screw 92, the latter being effective to vertically position the block 72 having the tool aperture 90 extending therethrough. The carriage 28 is adapted to be moved from tooth to tooth in a generally horizontal plane transversely of the patient's teeth T and for this purpose said carriage is adapted to be slidably moved longitudinally of the transverse bar 62, this movement being effected by the cooperative association of said transverse bar and the aperture 76 extending through the block 74 of said carriage.

From the above it will be apparent that the dental tool 14 associated with carriage 28 is

universally adjustable and may be rotated about the longitudinal axis of the bar 62 and may be transversely moved on said bar and furthersaid tool may be vertically adjusted by means of the adjustment screw 92. As aforepointed out the adjustment of the dental drill 14 about the longitudinal axis of the bar 62 is effected through the cooperation of the end portions 60 of said bar and the clamping screws 64 of the supporting members 50. Furthermore the supporting members 50 may be moved in unison towards and away from the support 22 whereby the carriage 28 and associated drill 14 may be concomitantly moved toward and away from said support. The supporting arms 24 and 26 of the support 22 have their end portions 48 positioned as aforedescribed whereby to provide for the proper positioning of the carriage 28 relative to the patient's teeth T when the support 22 is frictionally engaged to said patient's teeth.

In practice the support 22 will be made in a range of sizes to fit a corresponding range of patient's mouth sizes. If desired the transverse bar 62 can be threaded and aperture 76 of block 74 can be threaded complementary thereto so that the rotation of said transverse bar in any desired manner will be effective to translate the block 74 of the carriage 28. Once the dental drill 14 associated with the carriage 28 is adjusted to its desired position the series of holes 10 that are drilled through the teeth T will be aligned and parallelized, it being understood that after dental drill 14 is adjusted the carriage will be locked in position and will only be moved from tooth to tooth in a generally horizontal plane on the transverse bar 62 by releasing the clamping screw 78. In practice the support 22 will be placed in the patient's mouth and will be frictionally engaged to the patient's teeth through the medium of compound 34 whereby to provide a firm support for the carriage 28 and associated structure. Once the first hole, of a series of holes to be drilled in the patient's teeth, is drilled the remaining holes of such series will of necessity be parallel and aligned with said first hole whereby the pins 12 positioned in said series of holes will be accordingly aligned and parallelized. The carriage 28 for the support and guidance of the dental drill 14 is universally adjustable in the manner aforedescribed and is mounted externally of the patient's mouth whereby said carriage may be manipulated with ease by the dentist and will be comfortable to the patient. The apparatus 20 aforedescribed is of simple and durable construction, highly efficient and accurate in operation, and is comfortable in application to both the patient and dentist alike. The carriage 28 and associated structure may be used interchangeably with supports 22 of any size whereby the construction in a range of sizes discussed above will be applicable only to the support 22 per se. It will be understood that the support 22 may be frictionally engaged to either the lower or upper teeth and that the instant apparatus is adapted to drill aligned and parallelized holes 10 in any number of lower or upper anterior teeth, It will further be apparent that support 22 will be engaged to the lower teeth when lower anterior teeth are to be drilled and similarly said support will be engaged to the upper teeth when upper anterior teeth are to be drilled. The reference to dental tools as used herein is intended to include air abrasive apparatus and when the latter is used it may be associated with the vertically movable block 72 of the carriage 28 in any desired manner for supporting and guiding such apparatus in the manner aforedescribed.



While I have shown and described the preferred embodiment of my invention, it will be understood that various changes may be made in the present invention without departing from the underlying idea or principles of the invention within the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is:

1. Apparatus for the parallel guidance of dental tools, comprising a support adapted to be frictionally engaged to the patient's teeth, said support having a cutaway portion at the forward part thereof to provide clearance for a dental tool associated with said apparatus, guiding means positioned externally of the patient's mouth for the parallel guidance of dental tools, and means associated with said support and mounting said guiding means for movement in a generally horizontal plane transversely of the patient's teeth.

2. Apparatus for the parallel guidance of dental tools, comprising a support adapted to be positioned in the patient's mouth in fixed relation relative to the patient's teeth, guiding means positioned externally of the patient's mouth for the parallel guidance of dental tools and means associated with said support and mounting said guiding means for movement in a generally horizontal plane transversely of the patient's teeth, said support comprising a horseshoe frame having a cutaway portion at the forward part thereof to provide clearance for a dental tool associated with said apparatus.

3. A support adapted to support parallel guidance means for dental tools, comprising a horseshoe frame defining a receptacle adapted to contain a compound for frictionally engaging a patient's teeth, said frame having a cutaway portion at the forward part thereof to provide clearance for a dental tool associated with said parallel guidance means.

4. A support adapted to support parallel guidance means for dental tools, comprising a horseshoe frame defining a receptacle adapted to contain a compound for frictionally engaging a patient's teeth, said frame having a cutaway portion at the forward part thereof to provide clearance for a dental tool associated with said parallel guidance means, and a pair of supporting arms projecting forwardly of said frame, said arms being in laterally spaced relation and adapted for the support of said parallel guidance means.

5. Apparatus for the parallel guidance of dental tools, comprising a support adapted to be positioned in the patient's mouth in fixed relation relative to the patient's teeth, guiding means positioned externally of the patient's mouth for the parallel guidance of dental tools and means associated with said support and mounting said guiding means for movement in a generally horizontal plane transversely of the patient's teeth, said last mentioned means comprising a pair of supporting arms projecting forwardly of said support, each of said supporting arms having adjustably mounted thereon a supporting member, the latter being adapted to support said guiding means.

6. Apparatus for the parallel guidance of dental tools, comprising a support adapted to be positioned in the patient's mouth in fixed relation relative to the patient's teeth, guiding means positioned externally of the patient's mouth for the parallel guidance of dental tools and means associated with said support and mounting said

guiding means for movement in a generally horizontal plane transversely of the patient's teeth, said last mentioned means comprising a pair of supporting arms projecting forwardly of said support, each of said supporting arms having mounted thereon a supporting member, the latter being adjustable longitudinally of its associated supporting arm for concomitantly adjusting said guiding means, and means carried by said supporting members for supporting said guiding means for said movement in a generally horizontal plane transversely of the patient's teeth.

7. Apparatus for the parallel guidance of dental tools, comprising a support adapted to be positioned in the patient's mouth in fixed relation relative to the patient's teeth, guiding means positioned externally of the patient's mouth for the parallel guidance of dental tools and means associated with said support and mounting said guiding means for movement in a generally horizontal plane transversely of the patient's teeth, said last mentioned means comprising a pair of supporting arms projecting forwardly of said support, each of said supporting arms having mounted thereon a supporting member, the latter being adjustable longitudinally of its associated supporting arm for concomitantly adjusting said guiding means towards and away from the patient's teeth, means for clamping said supporting members in adjusted position, and means carried by said supporting members for supporting said guiding means for said movement in a generally horizontal plane transversely of the patient's teeth.

8. Apparatus for the parallel guidance of dental tools, comprising a support adapted to be positioned in the patient's mouth in fixed relation relative to the patient's teeth, guiding means positioned externally of the patient's mouth for the parallel guidance of dental tools and means associated with said support and mounting said guiding means for movement in a generally horizontal plane transversely of the patient's teeth, said last mentioned means comprising a pair of supporting arms projecting forwardly of said support, each of said supporting arms having mounted thereon a supporting member, the latter being adjustable longitudinally of its associated supporting arm for concomitantly adjusting said guiding means, and means carried by said supporting members for supporting said guiding means for said movement in a generally horizontal plane transversely of the patient's teeth, said last mentioned means comprising a transverse bar having its end portions carried by said supporting members, said bar being rotatable about the longitudinal axis thereof for concomitantly adjustably rotating said guiding means about said axis.

9. Apparatus for the parallel guidance of dental tools, comprising a support adapted to be positioned in the patient's mouth in fixed relation relative to the patient's teeth, guiding means positioned externally of the patient's mouth for the parallel guidance of dental tools and means associated with said support and mounting said guiding means for movement in a generally horizontal plane transversely of the patient's teeth, said last mentioned means comprising a pair of supporting arms projecting forwardly of said support, each of said supporting arms having mounted thereon a supporting member, the latter being adjustable longitudinally of its associated supporting arm for concomitantly adjusting said guiding means, and means carried by said supporting members for supporting said guiding means for said movement in a generally horizontal plane transversely of the patient's teeth, said supporting members being apertured and said last mentioned means comprising a transverse bar having its end portions adapted to be received in said apertures, said bar being rotatable about the longitudinal axis thereof for concomitantly adjustably rotating said guiding means about said axis, and means for clamping said bar end portions in adjusted position.



10. Apparatus for the parallel guidance of dental tools, comprising a support adapted to be positioned in the patient's mouth in fixed relation relative to the patient's teeth, guiding means positioned externally of the patient's mouth for the parallel guidance of dental tools and means associated with said support and mounting said guiding means for movement in a generally horizontal plane transversely of the patient's teeth, said last mentioned means comprising a pair of supporting arms projecting forwardly of said support, each of said supporting arms having mounted thereon a supporting member, the latter being adjustable longitudinally of its associated supporting arm for concomitantly adjusting said guiding means, and means carried by said supporting members for supporting said guiding means for said movement in a generally horizontal plane transversely of the patient's teeth, said last mentioned means comprising a transverse bar having its end portions carried by said supporting members, said bar being rotatable about the longitudinal axis thereof for concomitantly adjustably rotating said guiding means about said axis, said guiding means comprising a carriage, the latter having a part thereof apertured therethrough for the reception of a dental tool for supporting and guiding the latter, and means for adjusting said apertured part in a vertical plane for concomitantly adjusting a dental tool associated therewith.

11. Apparatus for the parallel guidance of dental tools, comprising a support adapted to be positioned in the patient's mouth in fixed relation relative to the patient's teeth, guiding means positioned externally of the patient's mouth for the parallel guidance of dental tools and means associated with said support and mounting said guiding means for movement in a generally horizontal plane transversely of the patient's teeth, said last mentioned means comprising a pair of supporting arms projecting forwardly of said support, each of said supporting arms having mounted thereon a supporting member, the latter being adjustable longitudinally of its associated supporting arm for concomitantly adjusting said guiding means, and means carried by said supporting members for supporting said guiding means for said movement in a generally horizontal plane transversely of the patient's teeth, said last mentioned means comprising a transverse bar having its end portions carried by said supporting members, said bar being rotatable about the longitudinal axis thereof for concomitantly adjustably rotating said guiding means about said axis, said guiding means comprising a carriage, the latter having one part thereof apertured therethrough for the reception of a dental tool for supporting and guiding the latter and another part thereof apertured therethrough for the reception of said transverse bar, said another part being movable longitudinally of said bar for concomitantly longitudinally moving a dental tool associated with said carriage, and

means for clamping said another part to said transverse bar in longitudinally adjusted position.

12. Apparatus for the parallel guidance of dental tools, comprising a support adapted to be positioned in the patient's mouth in fixed relation relative to the patient's teeth, guiding means positioned externally of the patient's mouth for the parallel guidance of dental tools and means associated with said support and mounting said guiding means for movement in a generally horizontal plane transversely of the patient's teeth, said last mentioned means comprising a pair of supporting arms projecting forwardly of said support, each of said supporting arms having mounted thereon a supporting member, the latter being adjustable longitudinally of its associated supporting arm for concomitantly adjusting said guiding means, and means carried by said supporting members for supporting said guiding means for said movement in a generally horizontal plane transversely of the patient's teeth, said last mentioned means comprising a transverse bar having its end portions carried by said supporting members, said bar being rotatable about the longitudinal axis thereof for concomitantly adjustably rotating said guiding means about said axis, said guiding means comprising a carriage, the latter having one part thereof apertured therethrough for the reception of a dental tool for supporting and guiding the latter and another part thereof apertured therethrough for the reception of said transverse bar, said another part being movable longitudinally of said bar for concomitantly longitudinally moving a dental tool associated with said carriage, means for clamping said another part to said transverse bar in longitudinally adjusted position, and means for adjusting said one part in a vertical plane for concomitantly vertically adjusting a dental tool associated therewith.

13. Apparatus for the parallel guidance of dental tools, comprising a support adapted to be positioned in the patient's mouth in fixed relation relative to the patient's teeth, guiding means positioned externally of the patient's mouth for the parallel guidance of dental tools and means associated with said support and mounting said guiding means for movement in a generally horizontal plane transversely of the patient's teeth, said last mentioned means comprising a pair of supporting arms projecting forwardly of said support, each of said supporting arms having mounted thereon a supporting member, the latter being adjustable longitudinally of its associated supporting arm for concomitantly adjusting said guiding means, and means carried by said supporting members for supporting said



guiding means for said movement in a generally horizontal plane transversely of the patient's teeth, said last mentioned means comprising a transverse bar having its end portions carried by said supporting members, said bar being rotatable about the longitudinal axis thereof for concomitantly adjustably rotating said guiding means about said axis, said guiding means comprising a carriage, the latter comprising a pair of vertically spaced parts, one of said parts being apertured therethrough for the reception of a dental tool for supporting and guiding the latter, and the other of said parts being apertured therethrough for the reception of said transverse bar, said other part and said bar being locked against relative rotation and the former being movable longitudinally of the latter for concomitantly longitudinally moving a dental tool associated with said carriage, means for locking said other part to said transverse bar in longitudinally adjusted position, and means for adjusting said one part in a generally vertical plane for concomitantly adjusting a dental tool associated therewith.

14. Apparatus for the parallel guidance of dental tools, comprising a support adapted to be positioned in the patient's mouth in fixed relation relative to the patient's teeth, guiding means positioned externally of the patient's mouth for the parallel guidance of dental tools and means associated with said support and mounting said guiding means for movement in a generally horizontal plane transversely of the patient's teeth, said guiding means comprising a carriage having a pair of vertically spaced parts, one of said parts being apertured therethrough for the reception of a dental tool for supporting and guiding the latter, and the other of said parts being apertured therethrough for the reception of said means associated with said support, said other part being movable longitudinally of said means associated with said support for concomitantly longitudinally moving a dental drill associated with said carriage, means for locking said other part to said means associated with said support in longitudinally adjusted position, and means for adjusting said one part in a generally vertical plane for concomitantly adjusting a dental tool associated therewith.

SAMUEL KAY.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| Number | Name | Date |
|---|---|---|
| 2,233,722 | Weigele | Mar. 4, 1941 |
| 2,318,403 | Karlstrom | May 4, 1943 |