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[54] DENTAL TREATMENT UNITS

[72] Inventors: **Ernst-August Behne; Otto Fleer,** both of Erlangen, Germany

[73] Assignee: **Siemens Aktiengesellschaft,** Erlangen, Germany

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[51] **Int. Cl.** **A61c 11/00**

[58] **Field of Search** 32/22; 312/209

[56] **References Cited**

UNITED STATES PATENTS

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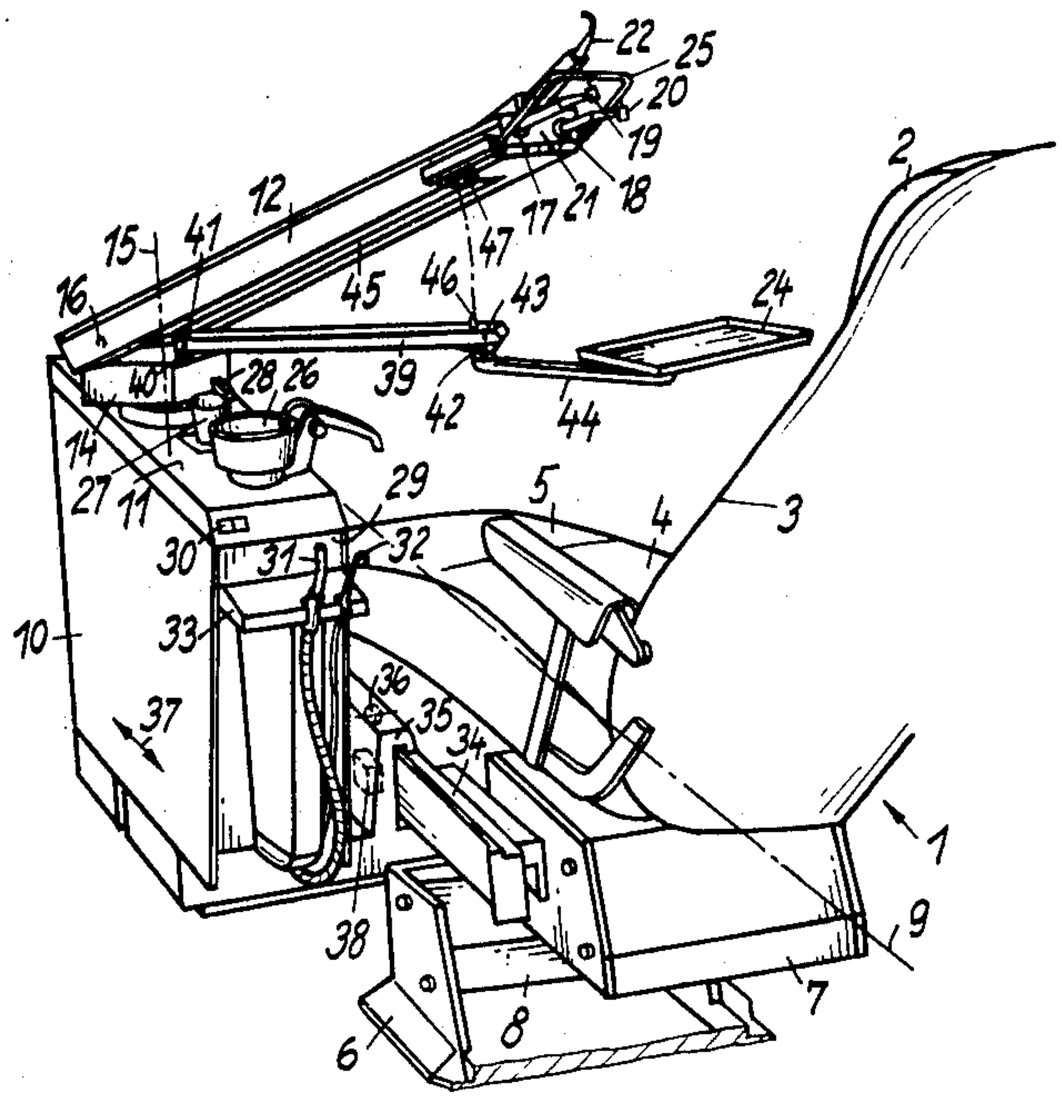
Primary Examiner—Robert Peshock
Attorney—Richards and Geier

[57] **ABSTRACT**

A dental treatment unit comprises a housing, a dental hand appliance support arm connected to the housing for pivotal arcuate movement in a substantially horizontal plane relatively to the housing and a counterbalanced dental instrument tray support arm assembly which is connected to the hand appliance support arm for pivotal arcuate movement therewith.

7 Claims, 3 Drawing Figures



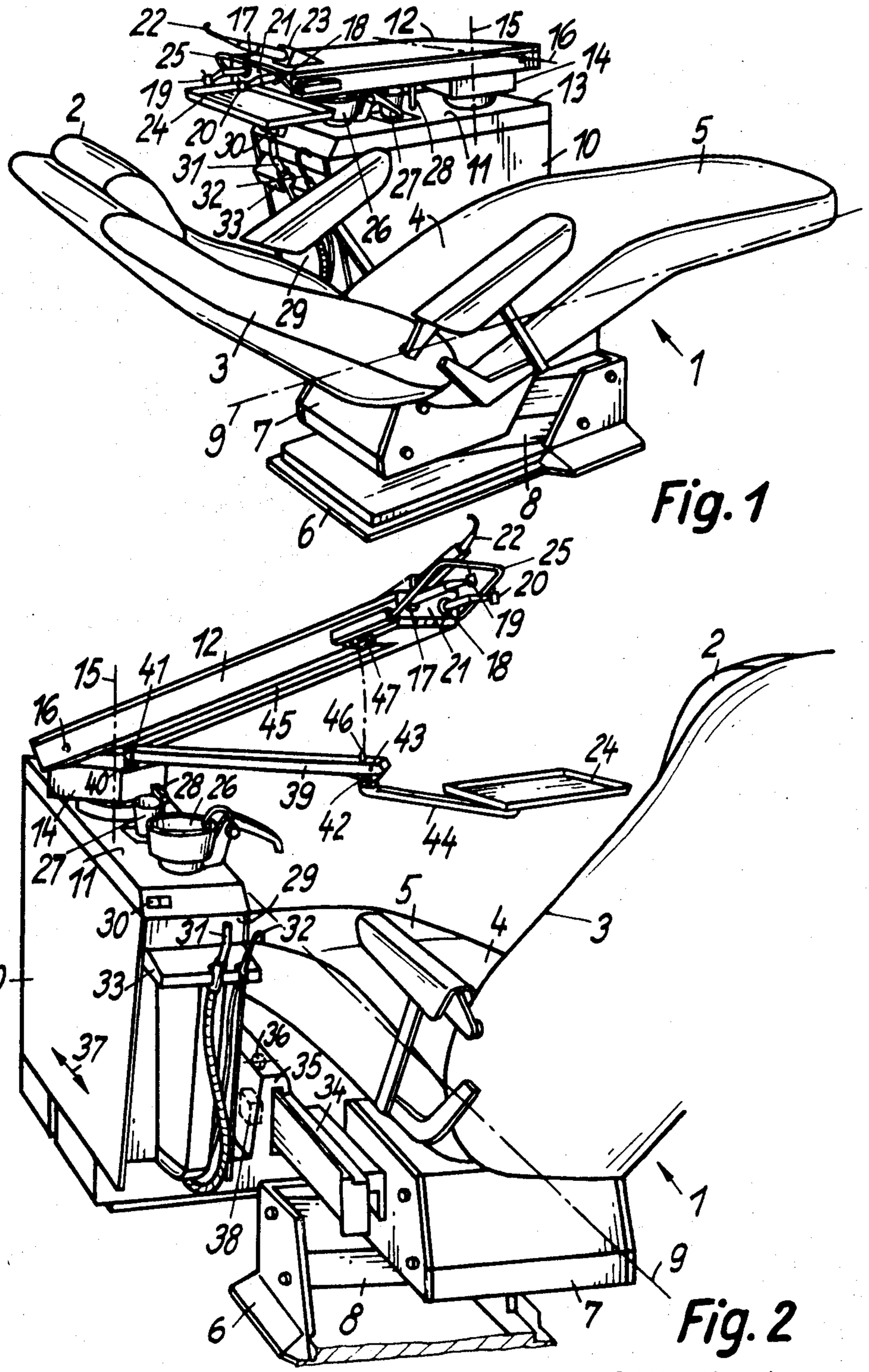


Fig. 1

Fig. 2

INVENTORS:
E.-A. Behne and O. Fleer
By Richards & Geier
ATTORNEYS

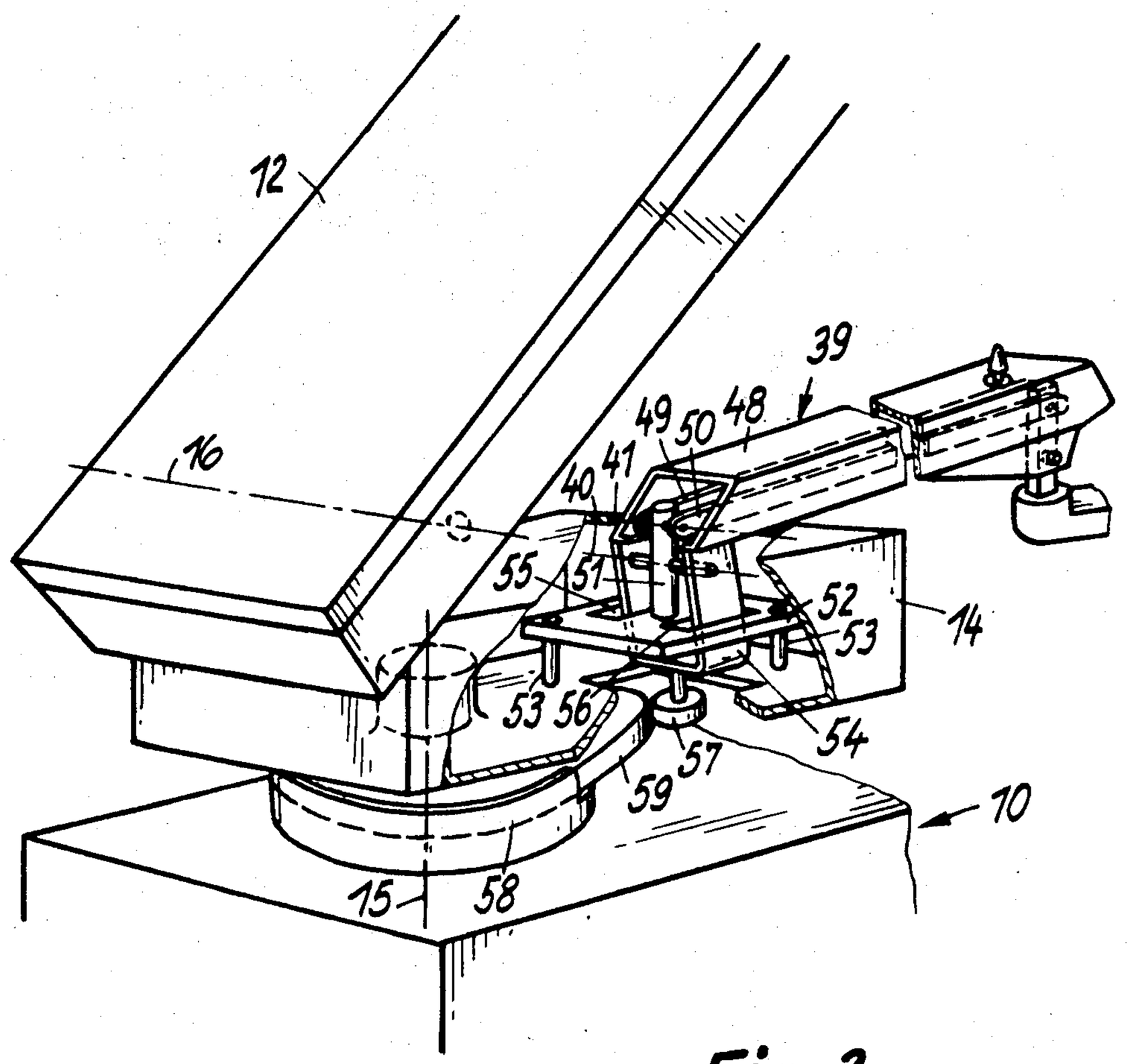


Fig.3

INVENTORS;
E.-A. Behne and O. Fleer
By Richards & Geier
ATTORNEYS

DENTAL TREATMENT UNITS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a dental treatment unit and is more particularly but not exclusively concerned with a dental treatment unit which is adapted to be supported by a patient's chair which is mounted on a base for adjustment in a generally vertical direction relatively to the base.

2. Description of the Prior Art

In such dental treatment units it is known to mount a horizontal support, which extends parallel to the longitudinal axis of the chair, at one of its ends on the vertically adjustable base part of the chair, and for a tubular upright to be mounted securely near its end which bears resiliently on the floor through the agency of an extensible part, on the free end of the horizontal support. The free end of the horizontal support is situated approximately in the region of the forward seat edge of the chair, and the dental unit is secured on the tubular upright to be rotatable about the upright by means of clips. The head of the dental unit is adapted to be inclined about a horizontal axis, and from one side surface of the inclinable head there can be pulled out a jib-like telescopic arm of relatively small cross section which at its free end carries a housing unit for dental hand appliances used for syringing and drilling and the like. The extensible conduits to the hand appliances extend between the unit head and the hand appliance housing in the open and, as long as the hand appliances are in their housings, are slightly tensioned by a winding device for the flexible conduits which is arranged in the dental unit. Owing to this construction, the dental unit with the telescopic arm can be pivoted about the tubular upright, the housing unit for the hand appliances describing, in a plane situated above the patient, an arc the radius of which is adapted to be varied by the various selectable lengths to which the telescopic arm can be pulled out. Also, the height of the pivoting plane above the patient can be varied by different inclinations of the dental unit head.

To complete the aforesaid dental unit there is also provided a tray on which instruments can be deposited and which is supported through the agency of linkage arms by a vertical telescopic tube which is also supported on the vertically adjustable chair part, by means of a second horizontal supporting arm which is secured by means of a vertical pivot bearing on the vertically adjustable chair part.

The invention proceeds from the realization that in a dental unit of the type described it is disadvantageous that the hand appliance housing unit and the instrument table can only be adjusted separately from one another. At each adjusting operation, more particularly at the horizontal pivoting of the hand appliance housing unit in the sense of adapting it to a modified working position on the part of the dentist, re-adjustment of the instrument table is also necessary and in the case of the known unit this has to be carried out additionally to the adjustment of the hand appliance housing unit.

The main object of the invention is to provide a dental treatment unit in which the aforesaid disadvantages are minimized or eliminated.

SUMMARY OF THE INVENTION

According to the present invention there is provided a dental treatment unit comprising (a) a housing, (b) a dental hand appliance support arm which is connected to the housing for pivotal arcuate movement in a substantially horizontal plane, relatively to the housing, and (c) a counter balanced arm assembly connected to the support arm for pivotal arcuate movement therewith, said assembly incorporating a hollow arm and a support arm which carries an instrument tray and which is linked to the hollow arm to form therewith a parallelogram linkage disposed within said hollow arm and which permits linear movement of the tray towards and away from the housing.

As a result, at each horizontal adjustment of the support arm, the instrument tray moves also, and thus always remains in the vicinity of the hand appliances which are adjusted to the particular position desired by the dentist in each case. The convenient arrangement consists in that both the support arm and also the counterbalanced arm assembly are pivotably mounted on a support casing which is securely connected to a vertical pivot bearing. This measure facilitates assembly or dismantling work on the dental unit since as a result the support arm, the arm assembly and the support casing form a single unit.

An advantageous further development of the invention consists in making the hollow arm adapted to be coupled to the arm by means of press stud means. In the coupled-up state, the instrument tray also accompanies any vertical movement of the hand appliance housing unit and at the same time retains its horizontal position in space.

It is also convenient to provide the underside of the arm with a recess in which the hollow arm can be housed over its entire length. If the hollow arm is lying in this recess, the overall height of the support arm remains unaltered. Increasing the height would in fact be a nuisance when the support arm is swung over the patient.

If a spittoon unit is supported on the dental unit according to the invention, there is a risk that the arm assembly situated below the support arm will impinge on the spittoon unit when the support arm is swung over the latter. In order to eliminate this risk, it is proposed that a part of the hollow arm which is supported in the support casing and is extended below the horizontal pivots is constructed as an abutment and on the dental unit there is provided a counter-abutment which, on pivoting of the arm assembly about the vertical pivot mounting, projects into the path of the abutment and, when the arm assembly approaches the spittoon unit, causes the arm to be lifted. The counter-abutment is advantageously constructed as a cam disc with a nose directed towards the spittoon unit.

BRIEF DESCRIPTION OF THE DRAWINGS

In order that the invention may be more fully understood an embodiment in accordance therewith will now be described by way of example with reference to the accompanying drawings, in which:

FIG. **1** shows a dental treatment unit connected to a patient's chair in an inoperative position,

FIG. **2** shows the dental treatment unit of FIG. **1** in an operative position, and

FIG. **3** shows constructional details of the counterbalanced arm assembly mounting.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In FIG. **1**, **1** designates a patient's chair, which consists of a head part **2**, a back rest **3**, a seat part **4**, a foot part **5**, a base **6** supported on the floor, a vertically adjustable base part **7** connected to the seat part **4**, and a parallelogram arm **8** connecting the two parts **6** and **7** to one another. The dot-dash line **9** represents the longitudinal axis of the patient's chair.

The dental unit includes an upright elongate housing **10** which is disposed to one side of, i.e., the left-hand side of the patient's chair **1** with its longitudinal extent parallel to the longitudinal axis **9** of the patient's chair **1**. On the upper surface **11** of the housing **10**, a support arm **12** is connected at one end for pivotal arcuate movement in a substantially horizontal plane about a substantially vertical axis **15** near the narrow end **13** adjoining the foot part **5** of the patient's chair **1**, through the agency of a support casing **14**. The arm **12** is also connected to the casing **14** for pivotal upward and downward movement about a horizontal axis in the form of a pin **16**. Dental hand appliances are carried by the other free end of the arm **12**, housings **17** and **18** for a turbine-type handpiece **19** and a micromotor handpiece **20** being inset into the end face **21** of the arm **12**, and a dental syringe **22** rests in a housing **23** fixed on the upper surface of the arm **12**. Below the

hand appliances **19**, **20**, **22** a dental instrument tray **24** is supported in a manner to be described. A stirrup-shaped handle **25** is also mounted on the free end of the arm **12** between the syringe **22** and the handpieces **19**, **20**.

That part of the upper surface **11** of the housing which is nearer the head part **2** of the patient's chair **1** is constructed as a spittoon unit and comprises at the upper surface **11** a removable spittoon bowl **26**, a mouth rinsing tumbler **27** and the mouth rinsing tumbler filling device **28**. At the narrow end **29** of the housing **10** there are also arranged operating pushbuttons **30** (for filling the tumbler, operating the syringe and the like) and below these operating pushbuttons **30** a strong-action suction hand appliance **31** and a saliva extractor appliance **32** are arranged to be removable from respective supports in a housing **33**.

As shown in FIG. **2**, an elongate support member in the form of a substantially horizontal guide rail **34** which extends parallel to the longitudinal axis **9** of the patient's chair **1** is mounted on the vertically adjustable base part **7**. A carriage **35** supporting the dental unit is supported to be displaceable lengthwise of the chair (arrow **37**) by means of bearings in the form of rollers **36** (for the sake of simplicity only one roller is illustrated) and to be lockable by means of releasable locking means constituted by an electromagnetic brake **38**. FIG. **2** also shows the way in which the tray **24** situated below the hand appliances **19**, **20**, **22** is supported. The tray **24** is supported by a counterbalanced arm assembly **39** which is disposed below the arm **12** and which is mounted at one end for pivotal movement on two horizontal axes **40** and **41** which are situated one above the other. The axes corresponding to these axes **40** and **41** at the tray-side end of the parallelogram arm are designated as **42** and **43**. For substantially horizontal pivoting of the tray **24** towards and away from the housing **10** there is arranged between the tray-side end of the arm assembly **39** and the tray itself a horizontal pivoting tray support arm **44**. At the undersurface of the arm **12** there is a recess **45** in which the hollow arm **48** of the arm assembly **39** can be housed over its entire length. In this recess **45** the hollow arm **48** can be connected-up to the arm by means of press stud means comprising a stud part **46** which is fixed to the arm **48** and with which there is associated a corresponding counterpart **47** within the recess **45**.

FIG. **3** shows the mounting of the counterbalanced arm assembly **39** on the housing **10**. The arm assembly **39** consists of the hollow arm **48** and two bars **49** and **50** disposed within the arm **48**. The bars **49** and **50** are mounted on a link **51** to be pivotable about the horizontal axis **41** and the arm **48** is mounted on the link **51** to be pivotable about the horizontal axis **40**. The hollow arm **48** is linked to the tray support arm **44** in the manner described to form therewith a parallelogram linkage which permits linear movement of the tray towards and away from the housing **10**. Counterbalancing is effected by a spring which is situated in the arm **48** and which is not shown in order to leave the drawing easier to read. The link **51** stands on a fitting **52** which itself is connected fast by means of spacer pins **53** to the underside of the casing **14**. Secured on the arm **48** is a stirrup-shaped extension **54** which extends through two openings **55**, **56** in the fitting **52** and on whose lower end a cam-follower in the form of a roller **57** is rotatably mounted. Associated with this roller **57** to act as a counter-abutment is a horizontal cam disc **58** which is connected fast to the housing **10** beneath the pivot bearing and which comprises a nose **59** pointing in the direction of the spittoon unit (FIGS. **1** and **2**) arranged on the housing. The form of the cam disc **58** is so chosen that when the arm **12** is not situated above the spittoon unit the arm assembly **39** with its tray **24** can be situated lower than the spittoon unit. Then when the arm **12** is swung above the spittoon unit, the roller **57** contacts the cam disc **58**. The nose **59** causes rotation of the extension **54** connected to the hollow arm **48** about the horizontal axis **40** in the sense of lifting the arm assembly **39** and the instrument tray **24**.

We claim:

1. A dental treatment unit having an instrument tray and comprising a housing, a support member carried by said housing and having a pivot bearing a dental hand applicance support arm connected at the housing to said support member, said pivot bearing having a vertical axis to permit arcuate movement of said arm relatively to said housing, and a counterbalanced parallelogram arm assembly having a free end carrying the instrument tray and an opposite end mounted on said support member below said support arm, said parallelogram arm assembly being pivotable along with said support arm and comprising a hollow arm.

2. A dental treatment unit according to claim **1** comprising a pivot bearing with horizontal axis connected to said support member, whereby said support arm is movable upwardly and downwardly relatively to said housing.

3. A dental treatment unit according to claim **2**, wherein said support comprises a casing, said pivot bearing supporting said casing upon said housing and permitting an arcuate movement of said casing relatively to said housing, said appliance support arm and said parallelogram arm being pivotally connected to said casing.

4. A dental unit as set forth in claim **1**, wherein a releasable locking device is provided for securing the arm assembly to the hand appliance support arm, the device being constituted by press stud means on the hollow arm and said support arm.

5. A dental unit as set forth in claim **3** and further including a dental spittoon unit mounted on the housing, wherein a cam is rigidly secured to the housing beneath the bearing and the support casing, a cam-follower element is secured to an extension of the hollow arm, which extension projects through the bottom of the casing whereby, when the hand appliance support arm is pivoted arcuately over the spittoon unit, the cam element cooperates with the cam to lift the counterbalanced arm assembly above the spittoon unit.

6. A dental unit as set forth in claim **5**, wherein the cam is provided with a nose which projects towards the spittoon unit.

7. A dental treatment unit housing an instrument tray and comprising a housing, a support member carried by said housing and having a pivot bearing a dental hand appliance support arm connected at the housing to said support member, said pivot bearing having a vertical axis to permit arcuate movement of said arm relatively to said housing, a counter balanced parallelogram arm assembly having a free end carrying the instrument and an opposite end mounted on said support member below said support arm, said parallelogram arm assembly being pivotable along with said support arm and comprising a hollow arm, said hand appliance support arm having the shape of a housing opening toward said arm assembly and enclosing said hollow arm, and a releasable locking device having press stud means on said hollow arm and said appliance support arm and securing said arm assembly to said appliance support arm.

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