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DENTAL CHAIR FOOTREST

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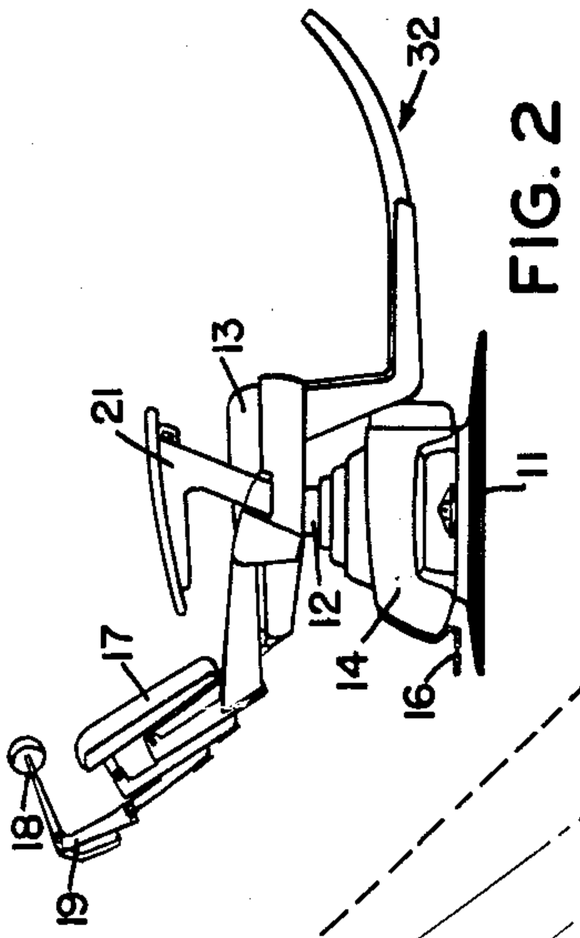

FIG. 2

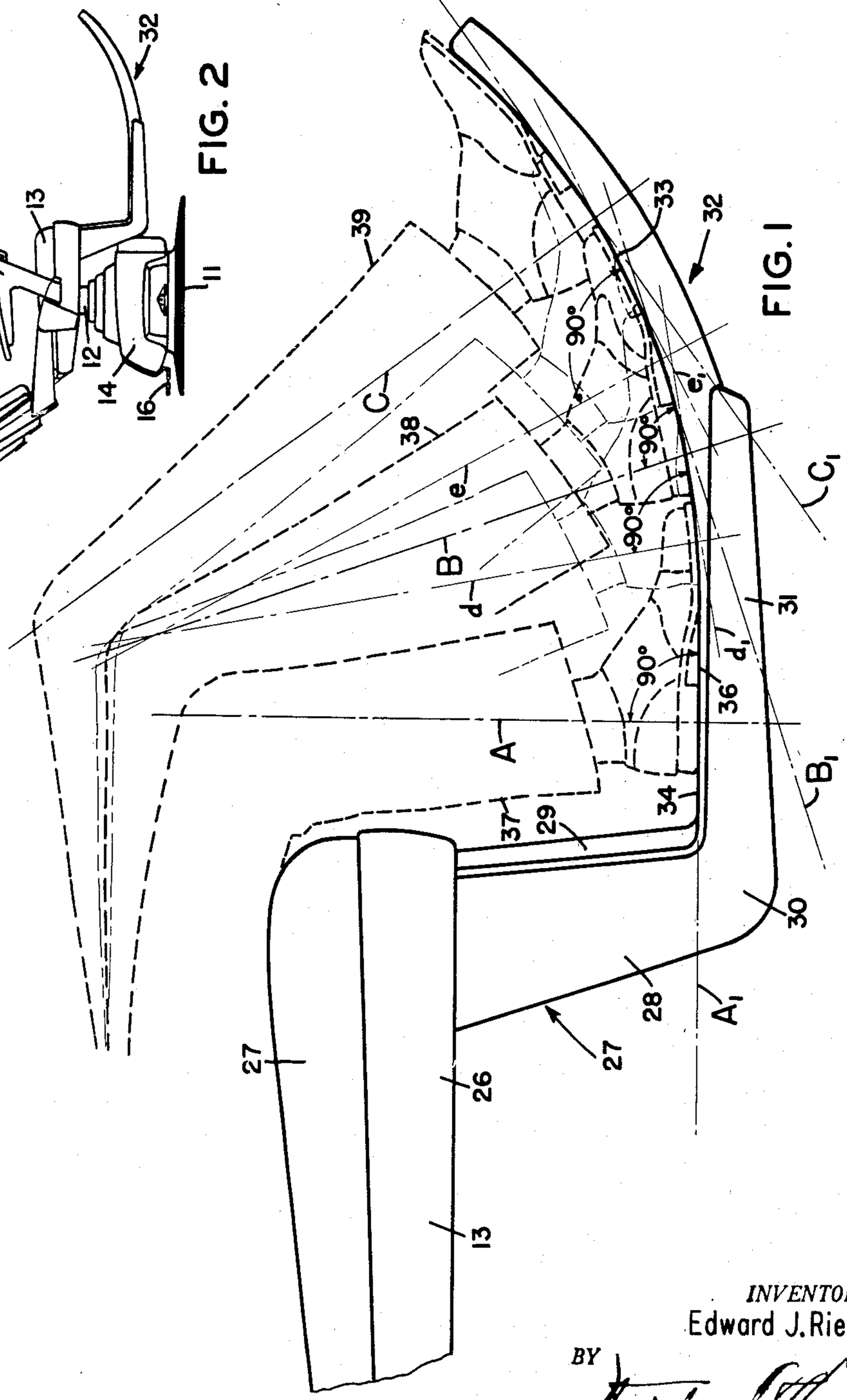

FIG. 1

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DENTAL CHAIR FOOTREST

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4 Claims. (Cl. 155—27)

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My invention relates to dental chairs and more particularly to a foot rest for such dental chairs.

It has been the practice in dental chairs to construct a foot rest or platform for the chair which comprises one substantially horizontal relatively large platform section and a smaller platform section forwardly of the horizontal section fixed at an angle to the horizontal platform section. This construction enables the patient to step on the horizontal platform section and when seated in the chair to rest the feet on the horizontal section of the foot rest or more frequently for greater comfort on the inclined or angularly extending smaller section. Usually the smaller or inclined platform section was approximately parallel to the soles of the patient's shoes when seated in the chair with the feet extended to the inclined section of the foot rest.

The above general and conventional structure had the objection of not being comfortable for all patients. A patient had a choice essentially of only two foot positions and these positions were comfortable only for patients having average leg lengths. This made it necessary for most of the patients to place the feet in an uncomfortable position. A short person could reach the foot rest only by slumping down in the chair while a person of great leg length found it necessary in most cases to rest the heels of his shoes on the outer edge of the angularly extending foot rest section.

Manufacturers have endeavored to overcome the above objections by making the platform or foot rest adjustable as a whole. By means of a pivot adjacent the rear of the horizontal platform section, a lever and a locking device, the platform could be raised or lowered to more accurately fit the patient. Such adjustable platforms or foot rests have distinct advantage over the non-adjustable type. However, they have very serious objections in that it required a certain amount of the dentist's time and effort to operate the mechanism. Moreover, frequently the benefit of this adjustable foot rest was entirely lost because the dentist had no way of determining in what adjusted position the platform would be most comfortable for the patient. He merely had to use his best judgment as to the proper position of adjustment by estimating the leg length of the patient. More often than not because of the time and effort required for its use, the dentist did not bother to use the adjustment.

An object of my invention is to provide a foot rest or platform for a dental chair which is

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simple in construction, inexpensive to manufacture and which will comfortably accommodate the legs and feet of patients whose leg lengths vary through a wide range.

Another object of my invention is to provide a foot rest or platform for a dental chair, the major part of the surface of which is curved substantially continuously outwardly and upwardly whereby a large number of patients seated successively in the chair whose leg lengths vary through a wide range may find a comfortable angular position of feet with respect to legs for his or her particular leg length.

More specifically my invention contemplates provision of a platform or foot rest for a dental chair, the foot rest having the major part of the surface thereof substantially continuously curved outwardly and upwardly from a position below and adjacent the forward edge of the seat, the curvature of said foot rest being generated by a multiplicity of radii whose origins lie substantially at the knee joints and whose termini lie just below the ankle joint of a multiplicity of patients successively seated in the chair whose leg lengths vary through a wide range, the lengths of said radii varying in accordance with the range of leg lengths encountered.

Other objects and advantages of my invention will be apparent from the following description, when taken in connection with the accompanying drawings, in which:

Fig. 1 is a detailed side elevation of the seat of a dental chair to which my novel foot rest is rigidly secured; and

Fig. 2 is a side elevation of a complete dental chair in which my novel foot rest or platform is incorporated.

The foot rest or platform of my invention may be incorporated in a dental chair structure of conventional design or may be incorporated in a dental chair of more advanced design such as that shown in Fig. 2. In general the chair comprises a base 11, a pedestal 12, and a seat 13 supported on the pedestal 12. A casing 14 houses a suitable cylinder and piston construction together with a hydraulic pump by which the pedestal 12, together with the seat 13, may be raised and lowered with respect to the base 11. Suitable foot controls 16 are provided for initiating and discontinuing the action of the pump.

The chair further includes a back rest 17 which is articulated with respect to the seat 13 and a head rest 18 which is articulated at 19 with respect to the back rest 17. The chair also includes arm rests 21 and suitable means for lock-

ing the back rest in a desired adjusted position with respect to the seat and suitable locking means for locking the head rest in a desired adjusted position with respect to the back rest 17. All of the above generally is conventional practice in the manufacture of dental chairs, is well known in the art and need not be more particularly described.

As shown in Fig. 1, the seat 13 includes a frame structure 26 which supports a cushion 27. Depending from the frame structure 26 and secured thereto in any suitable manner not shown is a bracket assembly generally indicated by the numeral 27. The bracket assembly may comprise two side brackets 28, one on each side of the seat between which a heel shield 29 having a slight forward curvature extends or the two brackets at the sides of the seat may be integral with the heel shield 29. The bracket 28 at each side of the seat is turned angularly as shown and extends forwardly with respect to the seat to form supports 31 on opposite sides of the chair for the reception of a platform or foot rest generally indicated by the numeral 32. If desired, the brackets 28 and the supports 31 may be formed integral as shown in the drawings and the heel shield 29 may be formed integral with the platform or foot rest frame 32. The heel shield 29 and the platform frame 32 may be then welded to the brackets 28 and the supports 31 or secured thereto in any other suitable manner.

The particular manner in which the platform or foot rest is supported from the seat frame does not constitute part of my invention except insofar as the support should be rigid with the frame. The platform or foot rest of my invention is intended for the comfortable reception of adults or taller children and hence, in its commercial application, no adjustment of the platform is contemplated.

The platform or foot rest frame 32 may be made in any suitable manner preferably of metal and includes a foot rest surface 33. The foot rest surface is particularly shaped and designed to provide maximum comfort for a multiplicity of patients whose leg lengths vary through a wide range. Adjacent the heel shield 29 the foot rest surface or platform is flat and substantially horizontal as indicated at 34. This provides a flat substantially horizontal surface upon which the patient may step when seating himself in the chair. Beyond approximately a transverse line indicated by the numeral 36 the foot rest surface or platform curves outwardly and upwardly in a substantially continuous curve which curve is generated by a multiplicity of radii whose lengths increase in a direction outwardly from the seat. These increased radii lengths represent increased lengths from a person with very short leg length to a person with very long leg length.

The shape of the foot rest surface or platform 33 is arrived at by starting with a person of normal height to provide a comfortably inclined chair foot rest in which the foot is positioned at an essentially right angle relation to the line from the ankle to the knee joint. That is, a line extending through the knee joint and through the ankle joint is essentially at right angles to a line drawn lengthwise of the foot or, as more particularly shown in the drawings, to a line drawn parallel to the heel and ball portion of the sole of the shoe. From this position the foot is moved through a limited arc about the knee joint without materially changing the ankle-knee and foot angular relation, thus allowing the patient adequate freedom of foot and leg movement. Other patients of varying leg length are positioned in the chair from a person of short leg length to a person of long leg length so that the substantially entire range of leg lengths of patients likely to be encountered have been positioned in the chair.

This multiplicity of patients whose leg lengths vary through a wide range is accommodated in a manner similar to that of a person whose leg length is substantially normal as described above. By experimenting with a sufficient number of patients whose leg lengths vary through a wide range, it is evident that to accommodate them in the manner set forth that a great number of flat planes ultimately result which may be joined into a smooth curve as shown in the drawings. The resultant curve is a development which most clearly accommodates the complete range of patients normally encountered by a dentist and in actual practice works out so that the curve of the foot rest surface is approximately elliptical

In Fig. 1, I have shown a leg 37, 38 and 39 of each of three patients. With respect to each of these legs I have drawn lines A, B and C, such lines extending approximately from the knee joint through the ankle joint. Lines A', B' and C' are lines drawn perpendicular to lines A, B and C and through the heel and ball portion of the sole of the shoe. Upon observing the leg 37 of the patient with shortest leg length, it will be observed that the patient has located a position on the foot rest surface or platform in which the foot is substantially at a right angle position with respect to the leg as indicated by the right angle position of the line A with respect to the line A'. A similar condition is shown with respect to the leg 38 by the lines B and B' in which the foot is approximately at a right angle to the leg. Likewise, in the case of the person with longest leg length 39, the right angle relation of the foot with respect to the leg is indicated by the lines C and C'.

It will thus be seen that the foot rest surface or platform of my invention is curved in such a manner as to comfortably accommodate a multiplicity of patients whose leg lengths vary through a wide range and that each patient may be accommodated so that the foot and leg are in an approximate right angle relationship which has been found to be the most comfortable relationship for most people. However, any foot position becomes uncomfortable if maintained for any extended length of time. In Fig. 1, I have shifted the leg 38 forward of the position indicated by the line B to a position indicated by the line *e*. It will, however, be noted that the line *e'* which is approximately parallel to the foot makes a 90° angle with the line *e*. Thus the patient may shift the position of his foot forwardly on the foot rest surface or platform without materially varying the foot-leg angular relationship. Similarly I have indicated by the lines *d* and *d'* a retracted position on the foot rest surface of the leg 38 from the position indicated by the letter B. In this retracted position the shape of the platform is such that notwithstanding the retracted position of the leg, approximately the same right angle relationship of the foot with respect to the leg is maintained. It will further be noted that the curvature of the foot rest surface also corresponds approximately

to the slight angular relation of the heel with respect to the sole of a normal shoe.

It will thus be apparent that I have provided a foot rest surface or platform, the major part of which is substantially continuously curved to provide a geometrical surface generated by radii whose origins lie within the knee positions and whose termini lie just below the ankle joint of patients whose leg lengths vary over a wide range, the length of said radii representing the various leg lengths encountered in such range of patients. It will also be apparent that for any patient normally likely to be encountered, there is a position or range of positions on the platform at which he may rest his feet comfortably and without strain and in which position a line drawn between the ankle joint and the knee joint is substantially at right angles to the foot.

While I have shown and described the preferred form of my invention, it will be apparent that various changes may be made, particularly in the form and relation of parts, without departing from the spirit of my invention as set forth in the appended claims.

I claim:

1. A chair, for dental patients, which has a seat with an articulated back and a foot rest conjoined with the seat, characterized by said foot rest having the major part thereof a substantially continuously curved geometrical surface generated by radii whose origins lie within the knee positions of patients when in said chair in normal seated positions, and whose lengths increase in accordance with longer patient-leg-lengths.

2. A chair for dental patients in accordance with claim 1 in which the radii describe approximately an ellipse.

3. In a dental chair of the type wherein a base supports a seat and a back support is articulated with said seat the combination with said structure of a foot rest secured to said seat, said foot rest having the major part thereof substantially continuously curved outwardly and upwardly from a

position below and adjacent the forward edge of the seat to a position remote from and forward of the seat, the curvature of said foot rest being generated by a multiplicity of radii whose origins lie substantially at the knee joints of a multiplicity of patients seated in normal positions in the chair whose leg lengths vary through a wide range, the lengths of said radii varying in accordance with the range of leg lengths considered.

4. In a dental chair of the type wherein a base supports a seat and the back support is articulated with said seat, the combination with said structure of a foot rest secured to said seat, said foot rest having the major part thereof substantially continuously curved outwardly and upwardly from a position below and adjacent the forward edge of the seat to a position remote from and forward of the seat, the curvature of said foot rest being such that the feet of patients of different leg lengths may rest thereon with the foot of each patient in essentially right angular relation to a line drawn between the heel of the patient and his knee joint.

EDWARD J. RIES.

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