Dec. 4, 1928. 1,694,243

E. B. WILFORD

DENTAL CHAIR

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Fig. 1.

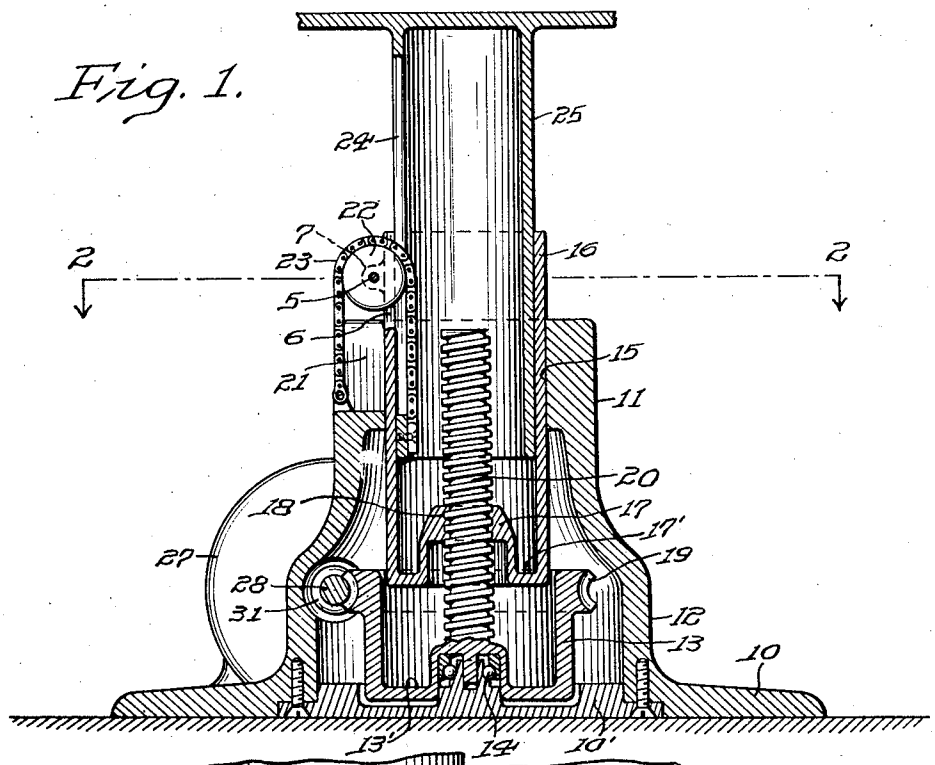
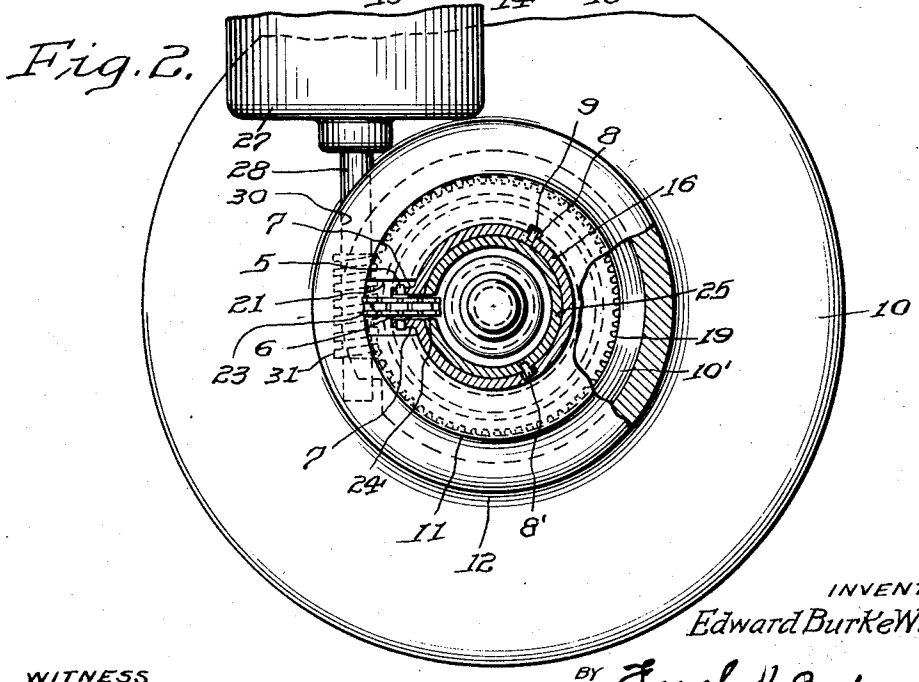


Fig. 2.



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Fig. 3.

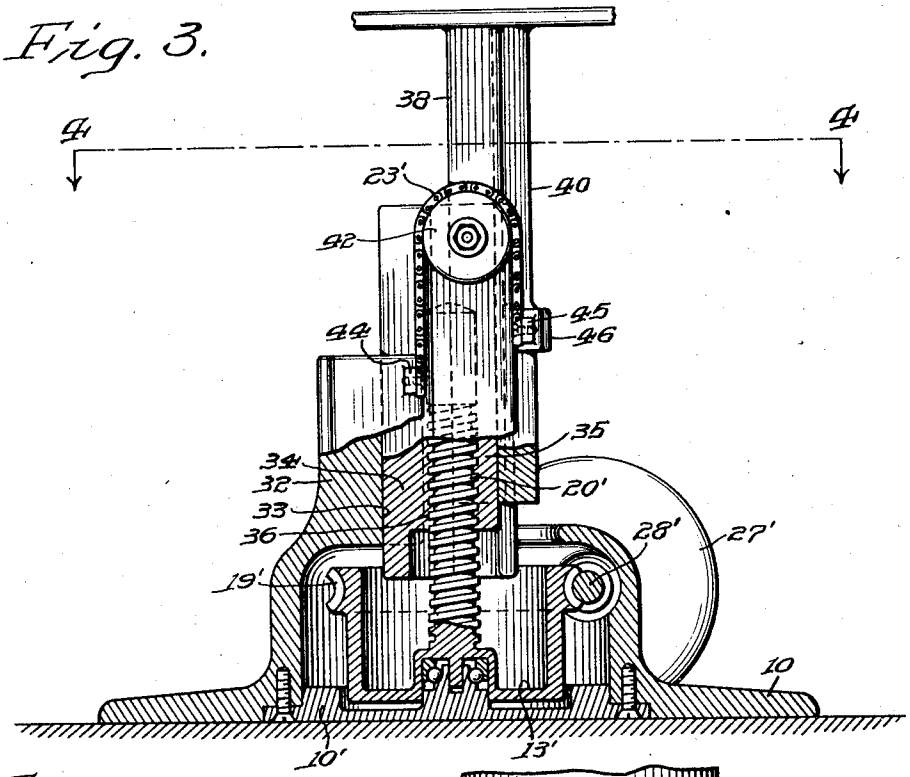
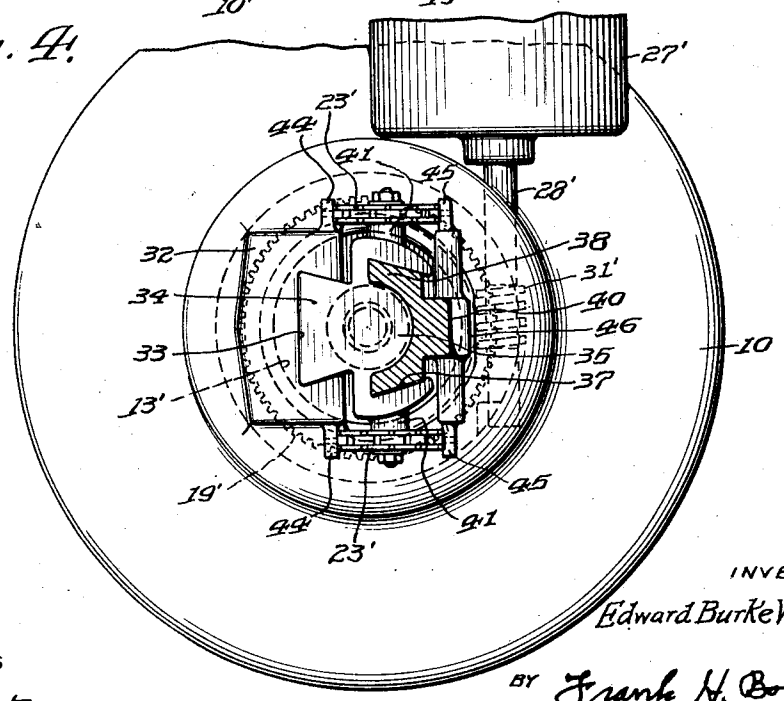


Fig. 4.



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UNITED STATES PATENT OFFICE.

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DENTAL CHAIR.

Application filed March 31, 1926. Serial No. 98,912.

My present invention relates to dental chairs, arranged for vertical adjustments.

Some of the objects of this invention are: to provide a chair in which the adjusting mechanism is compact; to provide a chair in which the upper and lower limits of adjustability are further apart than in the conventional chair; to provide a chair that is readily portable and is operable without affecting the floor upon which it is mounted; to provide a chair of appreciable lightness in weight to enhance its portability and operativeness; to provide a chair in which vertical adjustments are attained by electric power, and combined with a mechanical movement whereby the lift is appreciably enhanced; and to attain many other objects, and to effect improvements in construction and in the combination of parts, as will be apparent as the description proceeds.

In the accompanying drawings, Fig. 1, represents a vertical section through the preferred form of elevating mechanism, with the parts in slightly extended relation, Fig. 2, represents a horizontal section through the device shown in Fig. 1, Fig. 3, represents a side elevation of a slightly modified form of the invention with the parts in slightly extended relation, and Fig. 4, represents a horizontal section through the device shown in Fig. 3.

Referring now to the drawings, a base 10 is provided, upon which the vertical hollow support 11, with enlarged base 12, is mounted concentric with the base, and as shown in Fig. 1. The support is enlarged to receive the cupped or dished gear 13, which is integral with or keyed to a screw 20, and supported upon a bearing 14 in the removable base plate 10′, and the gear is formed with an axial annular groove or recess 13′.

Slidably mounted in the support 11, and held against rotation relative the support by the cooperating conventional slot or key-way 8 and key 9, in the guiding inner surface 15 of the support, is the cylindrical guide section or primary standard 16. The standard is closed at the lower end by a relatively thickened depending nut portion 17, which is axially bored and threaded as at 18. The screw 20 rotatable with the gear, is operatively mounted in the threaded opening or bore 18 of the standard. It will be obvious that rotation of the gear will cause corresponding vertical movement of the standard relative the stationary support 11.

In the upper end of the standard ears 7 are projected outwardly having a slot between them, as at 6. A pulley or roller 22 is positioned in the slot and supported for rotation on the ears, as by a pin 5. The upper end of the support 11 is vertically slotted as at 21 to receive the ears and pulley when the primary standard is in a retracted position, with the depending end thereof received within the annular groove of the gear, although without contact therewith. In such retracted position it will be clear that lower end of the primary standard will be in close proximity to the floor, although spaced therefrom by the base plate, bearing, and the dished gear and the clearance maintained between the gear and the end of the standard.

A secondary standard or telescoping element 25, having a vertical slot 24, is slidably mounted in the standard 16, if desired being keyed thereto by a conventional key and key-way assembly 8′. The arrangement is such that a portion of the pulley 22 projects into the slot 24, and the chain or cable device 23, passes over the pulley or roller into the slot and is anchored at one end below the slot 24 to the wall of the telescoping standard, and at the other end is anchored or secured to the support below the slot 21. Obviously the cable means may be fastened in any desired manner or at any desired points. The upper end of the telescoping standard is arranged to receive the dental chair, (not shown) which it supports.

An electric motor 27 of any desired sort is mounted on the base 10, with the shaft 28 thereof extending horizontally through an opening 30 in the enlarged portion 12 of the support 11. The shaft carries a worm 31, in mesh with the teeth 19 of the gear 13. Suitable devices may be used to control the motor and to break the circuits therethrough at the limits of movement of the parts, but as they form no part of this invention and are common in the art, they will not be described.

It will be apparent that with the chair in its lowermost position, the secondary standard will have telescoped into the primary standard or guide section 16, so that the lower end thereof will have entered the annular recess 17′ of the dependent nut portion thereof, although without contacting therewith. The secondary standard is thus primarily supported by the chain or cable means. Similarly, the primary standard or guide section

will have been retracted to the position previously described, and of course, the puller or roller 22 will have reached its lowermost position in the slot 21. With the parts in this position rotation of the worm 31 in the proper direction by the motor causes rotation of the gear and the associated screw, and thus effects vertical movement of the primary standard. Simultaneously with such movement the secondary standard will move from its telescoped position and will be extended or projected from the primary standard as fast as the latter is extended or projected from the support. This is due to the pulley and chain action incident to relative movement between the support and the primary standard, as will be understood. Reversal of the motor will cause the primary standard to be retracted and the telescoping standard to be lowered by gravity.

In the modified form shown in Figs. 3 and 4, the support instead of being annular or cylindrical, is in the general form of a rectangular block 32, having on one face a vertical angular slot 33, substantially triangular in cross-section, arranged to receive slidably the laterally extending vertical rib 34 of a primary standard 35, in dovetail relation. This rib is axially bored as at 36 and threaded to receive the screw 20′, similar to that shown in Fig. 1, and is arranged for vertical sliding motion relative the support 32. The primary standard is also vertically slotted as at 37, to receive the laterally extending vertical rib 38, of the secondary extensible member 40. In cross-section the slot 37 is angular, so arranged as to retain the rib in position, yet to permit sliding vertical movement therein. The chair, (not known), is arranged upon the upper end of the secondary member 40.

The primary standard has laterally extending lugs 41, upon which pulleys 42 are journaled. A chain or cable 23′ passes over each pulley and is anchored upon a lug or ear 44 of the support at one end, and to a projection or lug 45 on the inner face of the wall 46 of the secondary standard or member 40. It is preferred to use a plurality of cable and pulley means in this form of my invention, although obviously a single one might be sufficient, even as it would be perfectly feasible to use a plurality of such devices in place of the single one shown in Figs. 1 and 2. The modified form shown in Figs. 3 and 4 has a number of duplications of the parts used in the preferred form, as for instance that it is mounted upon a similar base 10, with the removable base plate 10′, the cupped gear may be similar with the annular groove or recess 13′ and teeth 19′. A similar motor 27′, with shaft 28′ carrying worm 31′ may be used for actuating the device. The operation of the modified form is similar to the operation of the preferred form. Any desirable or suitable antifriction devices and oiling means or attachments, (not shown) may be used as will be found most expedient.

It will be noted that the invention provides a dental chair of great simplicity, in which the weight is minimized, which takes up but little space, being quite compact, which requires no openings in the floor for its operation or installation, which can be raised to a very high point when desired, and yet is quite close to the supporting floor in its lowered position, which raises the patient to a high point when desired and yet is quite efficient as to the power expended, and one in which the cost is greatly reduced. Obviously many changes may be made in the device without departing from the spirit of the invention, and all such should be considered as within the scope of the following claims, except as they are otherwise limited.

I claim as my invention:

1. In a dental chair the combination with a support, of a guide section slidably mounted on the support, a dished gear into which the section nests, a screw operatively engaging said section and arranged for rotation with the gear, a standard slidably engaging said section and having a slot, a pulley mounted for rotation on said section and slidable in said slot, and means connected to said support and to said standard and extended through the slot over said pulley, and a power source for turning the gear, the whole so arranged that as the section is raised by the screw the standard is raised by said means.

2. In a dental chair the combination with a base, of a vertically slotted support carried thereby, a guide section having a nut portion with a threaded bore and slidably mounted on the support, a gear mounted on the base, a screw operable with the gear in the threaded bore, said section having an ear, a roller journaled on said ear, and having sliding relation to said slot upon movement of the section, a standard slidably mounted in said section having a slot, and cable means passing over the roller and through the slots and connected to the support and the standard, and electric means for rotating the gear.

3. In a dental chair the combination with a base, of a support carried thereby, a guide section slidably mounted on the support and having a nut portion with a threaded bore, a gear mounted on the base, a screw operable with the gear in the threaded bore, a standard slidably mounted in said section, the support, the guide section and the standard all having registering slots, a pulley mounted upon the section and normally extending through all of the slots, cable means passing over the pulley and through the slots, the ends of which are secured to the standard and the support respectively, and electrically driven means for rotating the gear.

4. In a dental chair in combination, a support having a cylindrical guiding surface and

a vertical slot communicating with said surface, a cylindrical standard slidably mounted in the support, electrically driven gearing mounted on the support for actuating the standard, a roller mounted on the standard and extending laterally beyond the periphery thereof in vertical registry with said slot, a secondary cylindrical standard concentrically slidably mounted in the first mentioned standard, cable means passing over the roller, the opposite ends of which are connected respectively to the secondary standard and to the support in the slot, the arrangement being such that the cable end and the roller are both housed in the slot when the standards are in their retracted position.

5. In a dental chair in combination, a support having a cylindrical guiding surface and a vertical slot communicating with said surface, a cylindrical standard slidably mounted in the support, electrically driven gearing mounted on the support for actuating the standard, a roller mounted on the standard and extending laterally beyond the periphery thereof, a secondary cylindrical standard concentrically slidably mounted in the first mentioned standard and having a vertical slot, cable means secured to the inner surface of the secondary standard, extending through the slot therein and over the roller, with the opposite end thereof connected with the support in registry with the first mentioned slot, whereby the secondary standard may be retracted within the first mentioned standard and simultaneously the first mentioned standard may be retracted within the support with the roller and exposed cable end housed in the first mentioned slot.

In testimony whereof I affix my signature.

EDWARD BURKE WILFORD.