Feb. 15, 1955 C. F. SHUESSLER 2,702,072

FOLDING DENTAL OPERATING CHAIR

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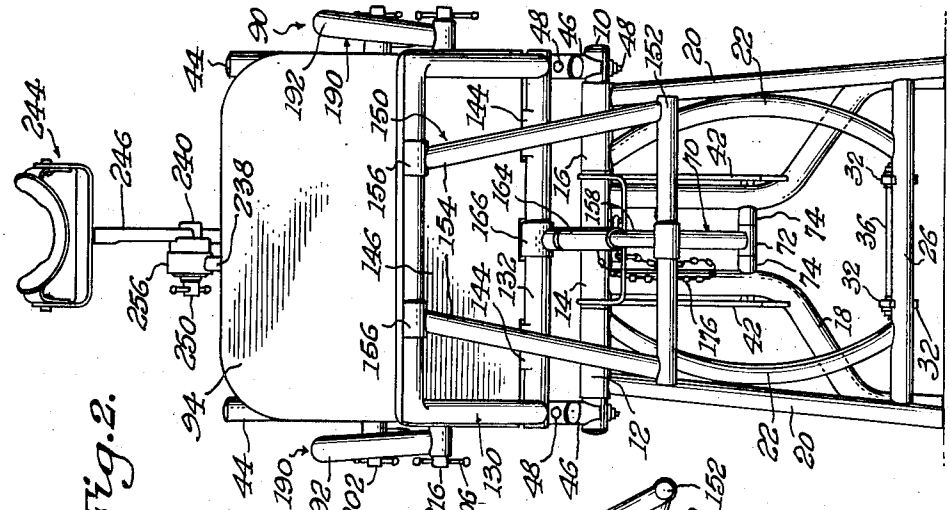


Fig. 2.

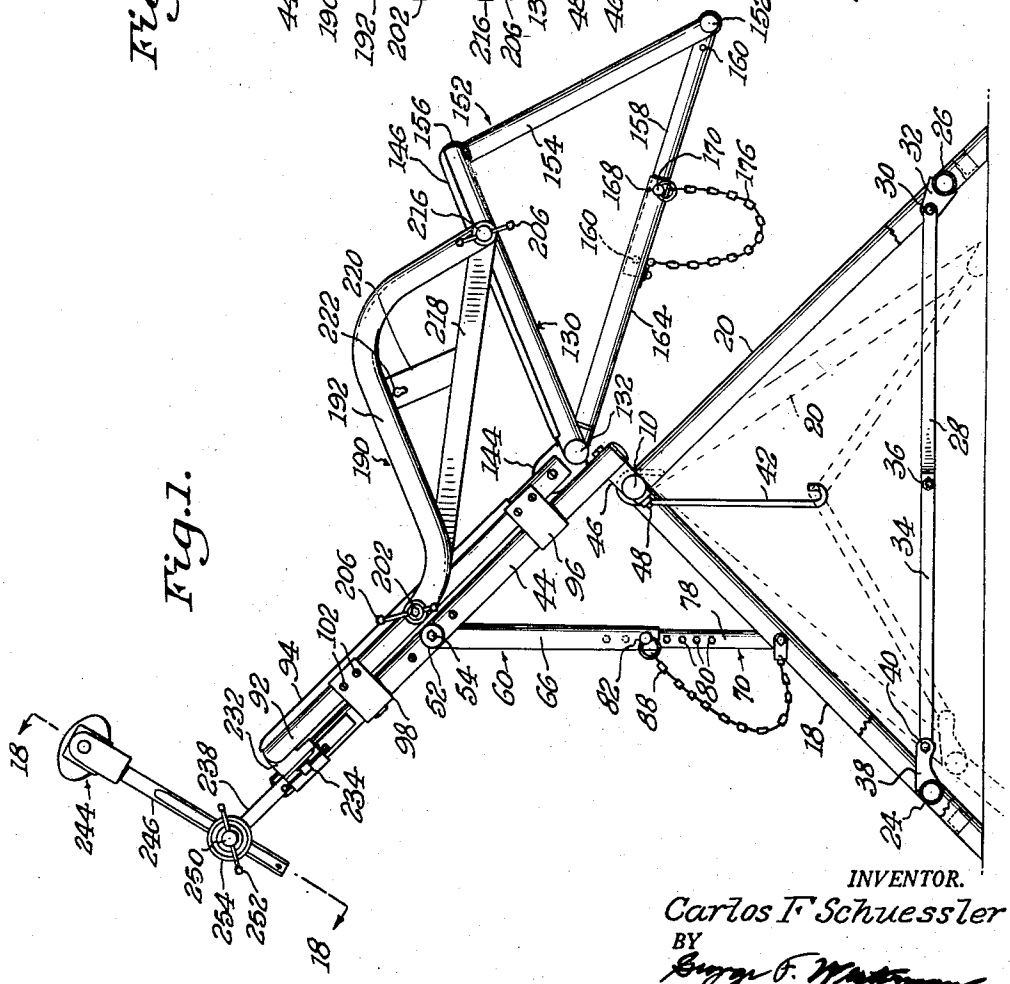


Fig. 1.

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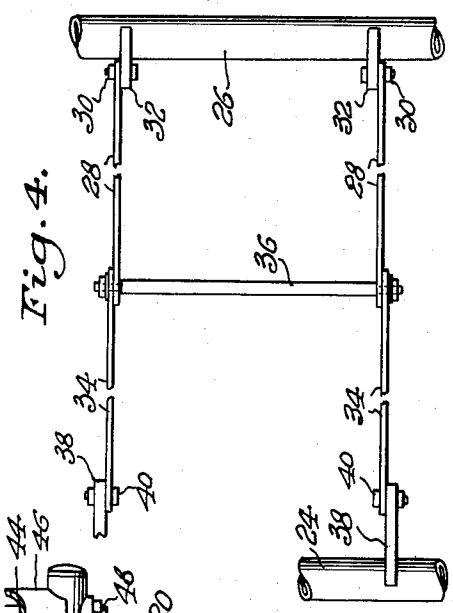


Fig. 4.

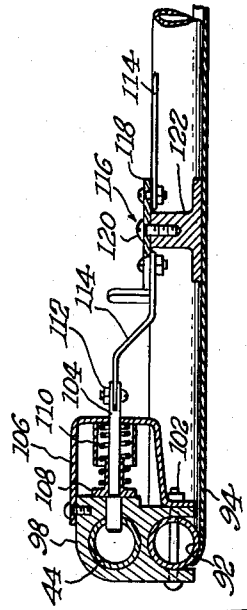


Fig. 7.

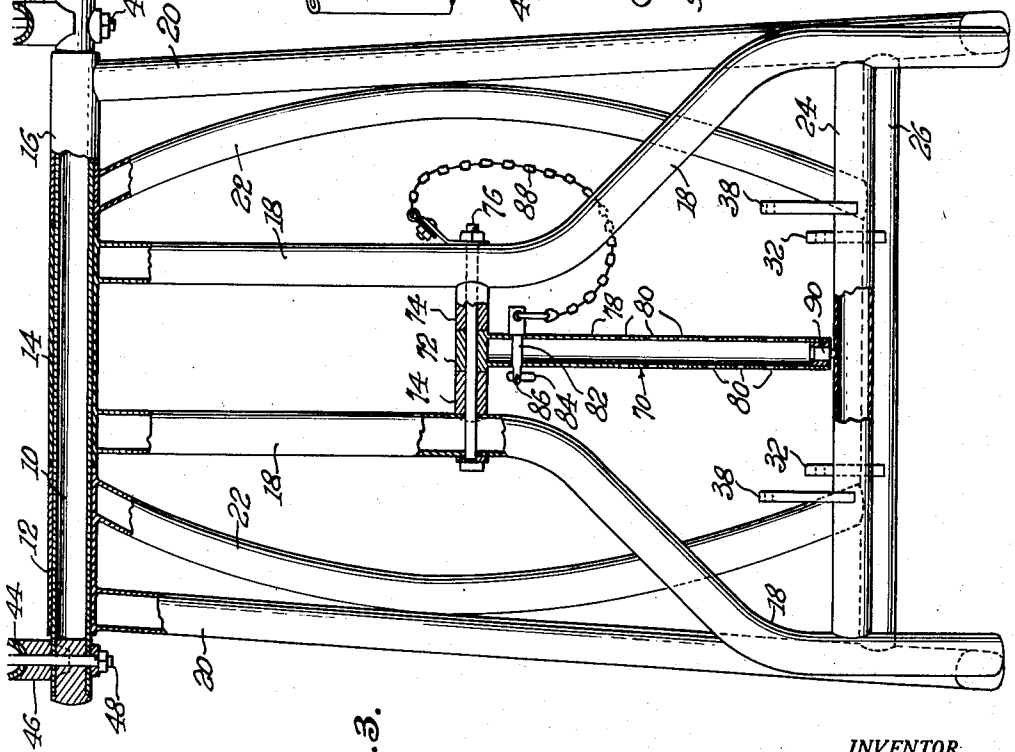


Fig. 3.

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FOLDING DENTAL OPERATING CHAIR

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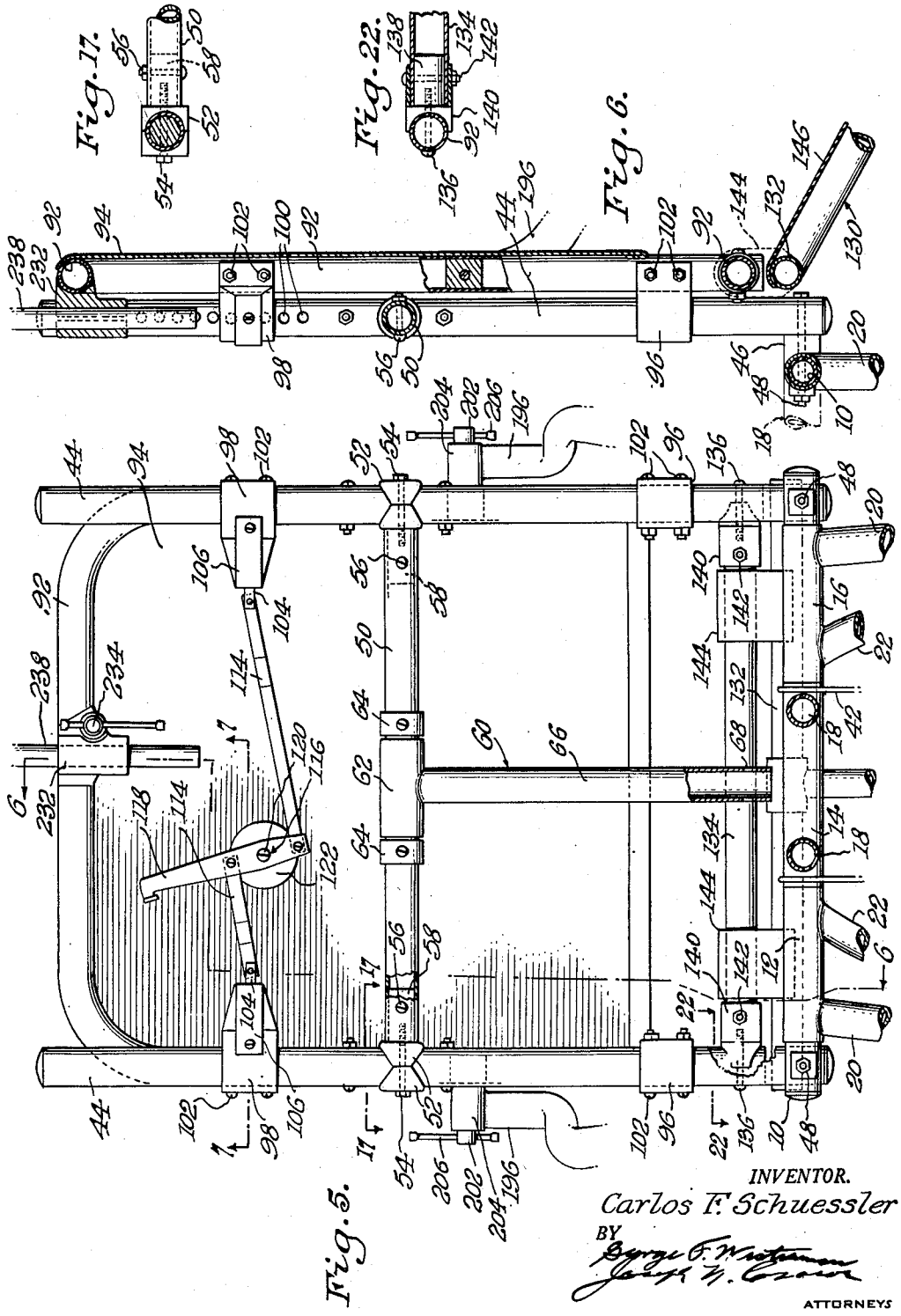


Fig. 17.

Fig. 22.

Fig. 6.

Fig. 5.

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FOLDING DENTAL OPERATING CHAIR

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Fig. 8.

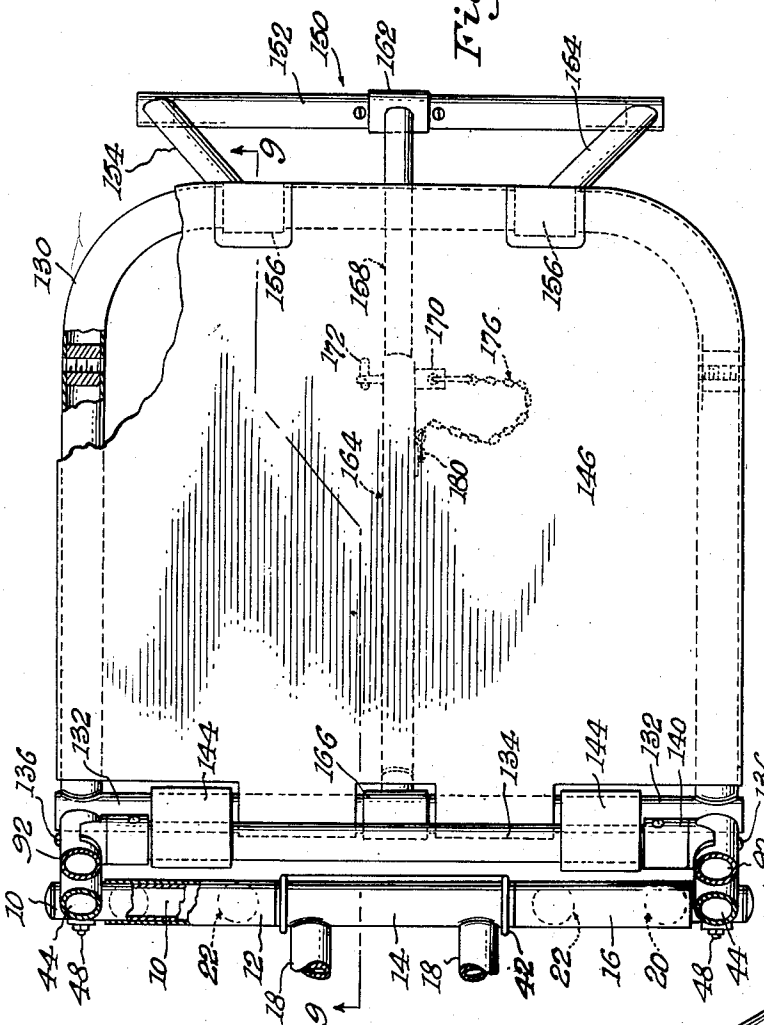


Fig. 9.

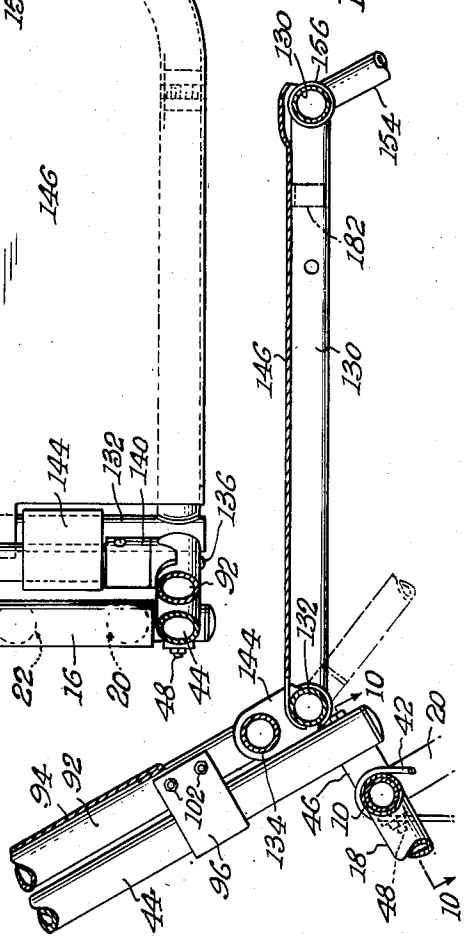
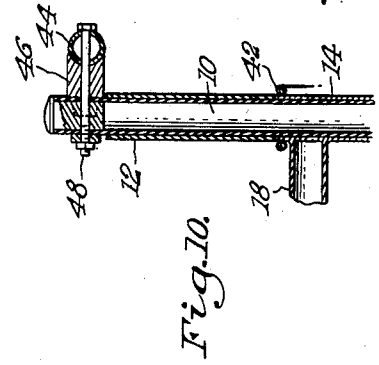


Fig. 10.

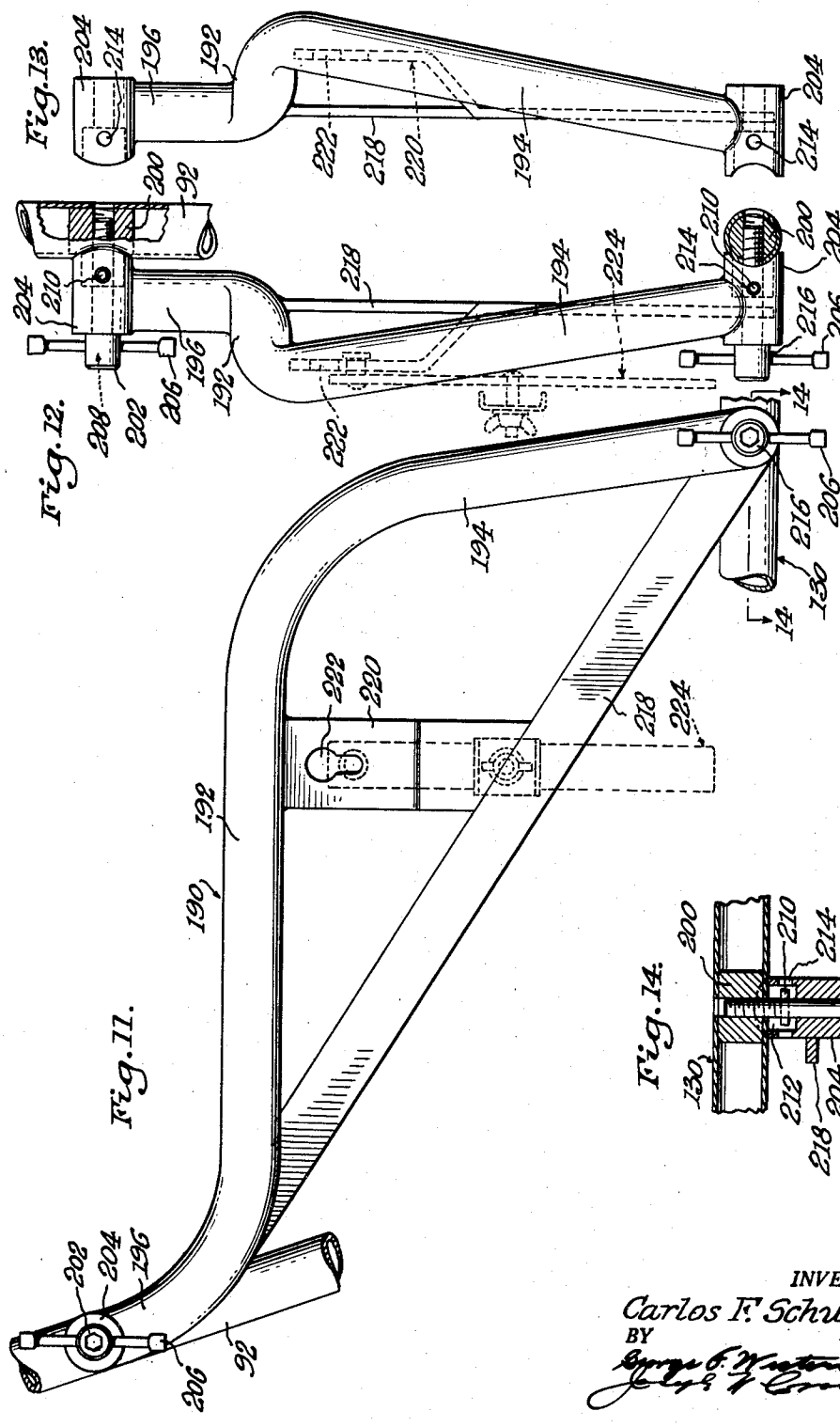


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FOLDING DENTAL OPERATING CHAIR

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Feb. 15, 1955 C. F. SHUESSLER 2,702,072

FOLDING DENTAL OPERATING CHAIR

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Fig. 15.

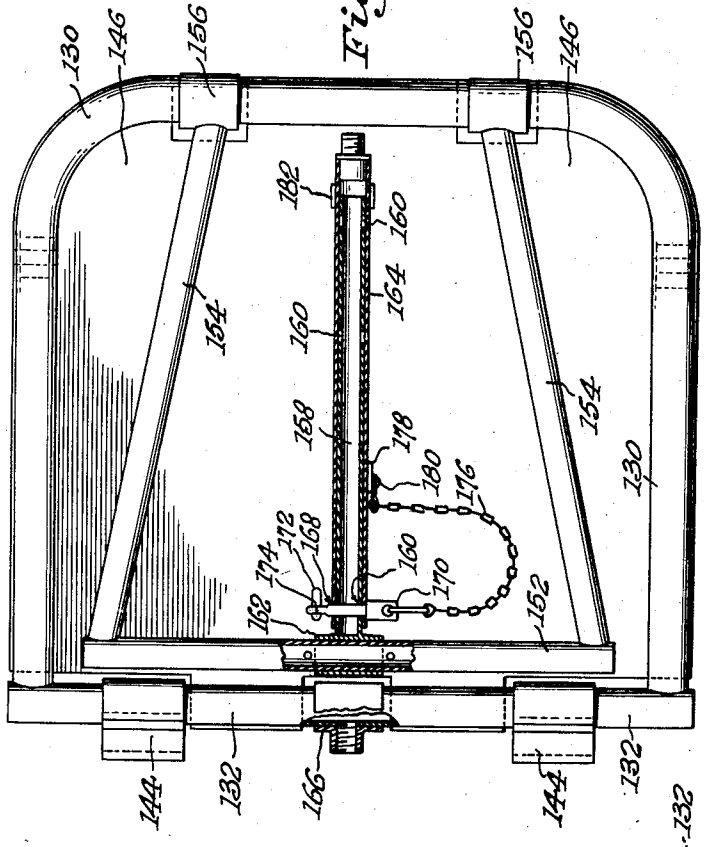


Fig. 16.

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FOLDING DENTAL OPERATING CHAIR

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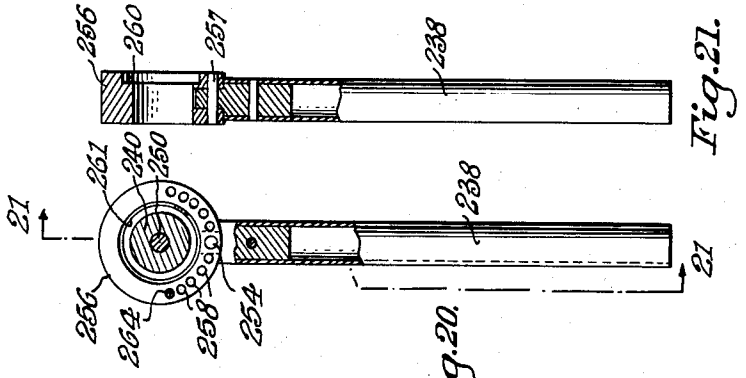


Fig. 21.

Fig. 20.

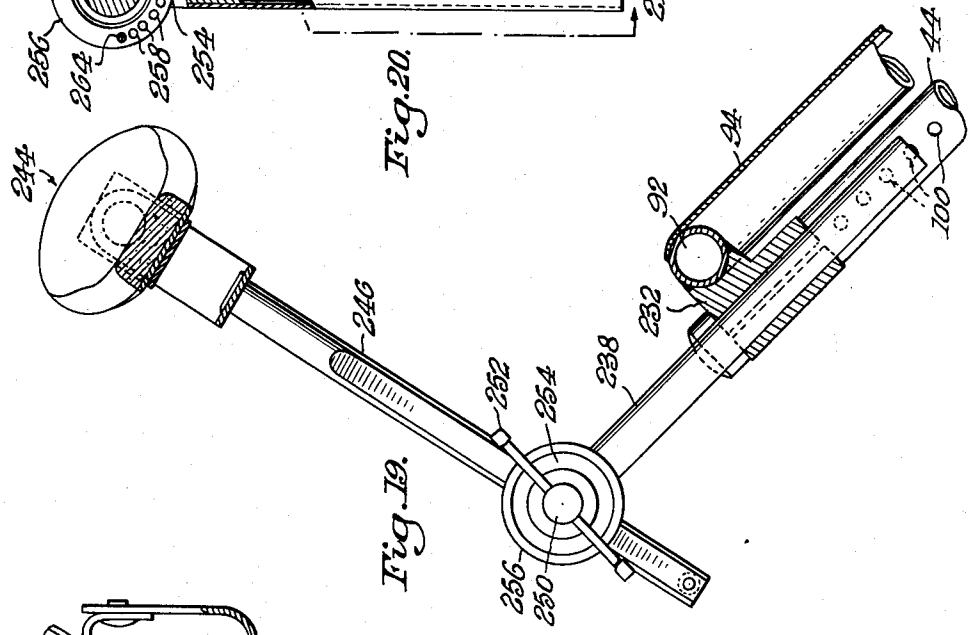


Fig. 19.

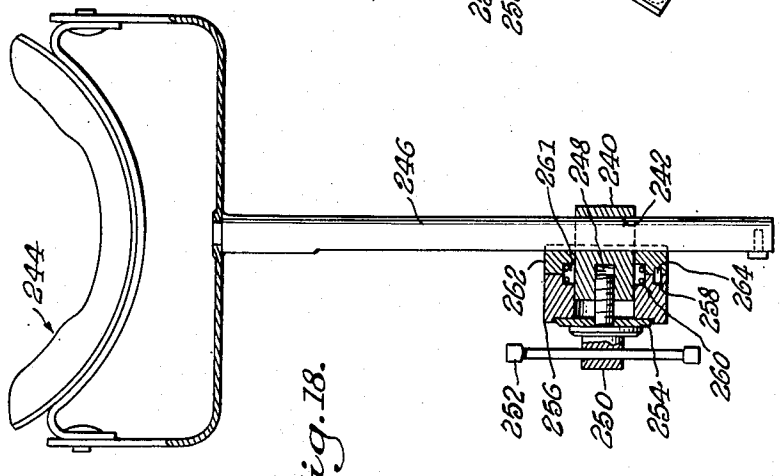


Fig. 18.

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Patented Feb. 15, 1955

2,702,072

FOLDING DENTAL OPERATING CHAIR

Carlos F. Schuessler, United States Air Force, assignor to the United States of America as represented by the Secretary of the Army

Application November 21, 1952, Serial No. 321,963

3 Claims. (Cl. 155—26)

(Granted under Title 35, U. S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without payment to me of any royalty thereon.

This invention generically relates to chairs, but more particularly it is directed to a knocked down foldable chair suitable for use by a dentist in the practice of his profession.

In the past there has been a need within the field forces of the Armed Services for a knocked down folding dental operating chair which can be transported conveniently along with the mobile units of the dental corps to the field where it can be readily assembled for use in the field. To fulfill this need, a chair was desired which by means of its construction could be knocked down and folded into a compactness permitting it to be packed within a standard field chest and one which is light enough to permit its transportation with convenience to the field where it can be readily unfolded and assembled for field dental service.

It is the principal object of this invention to provide a dental chair of light weight having its primary components foldable into a compact unassembled form for convenient transportation but adapted to be readily assembled to provide a conventional dental chair.

It is another object of this invention to provide a dental chair which may be knocked down and folded into a compact form having the back, seat, and legs in overlying relation with respect to each other for transportation and readily assembled into a chair affording all of the facilities of a standard dental chair including its rigidity.

Other objects will appear from a reading of the following description of the invention, taken in conjunction with drawings, wherein:

Fig. 1 is a side view of the dental chair showing in dotted lines the retracted alternative position of the legs;

Fig. 2 is a front view of the dental chair;

Fig. 3 is a rear elevation showing the base structure in its folded and inoperative position, parts being shown in section;

Fig. 4 is a detailed plan view of the front and rear legs stop;

Fig. 5 is a rear view showing the back of the chair and its base pivot connection;

Fig. 6 is a vertical sectional view of the chair supporting assembly with the chair back shown in section, the section being taken along line 6—6 of Fig. 5;

Fig. 7 is a horizontal sectional view showing in detail the chair standards locking device, the section being taken along line 7—7 of Fig. 5;

Fig. 8 is a plan view of the seat portion of the chair in its operative position and showing its pivotal connection to the back frame, with parts in section;

Fig. 9 is a horizontal sectional view of the seat portion of the chair, the section being taken along line 9—9 of Fig. 8;

Fig. 10 is a horizontal sectional view showing in detail the connection between the chair supporting frame and base, the section being taken along line 10—10 of Fig. 9;

Fig. 11 is a side view of the chair arms provided with a bracket for receiving the cuspidor hanger shown in dotted lines;

Fig. 12 is a front view of the chair arm secured to the chair with a portion cut away showing the threaded bolt connections to the chair;

Fig. 13 is a front view of the other chair arm with the bolt connectors removed;

Fig. 14 is a horizontal sectional view showing the chair arm bolt connections, the section being taken along line 14—14 of Fig. 11;

Fig. 15 is an inverted plan view of the seat of the chair and showing the foot-rest in its folded position;

Fig. 16 is a view similar to Fig. 6 showing the foot-rest in folded position under the seat and in dotted lines the seat and foot-rest in folded position against the front of the back, with the legs folded against the rear side of the back;

Fig. 17 is a horizontal sectional view showing the joint construction used in securing the horizontal rod 50 to the standards 44, the section being taken along line 17—17 of Fig. 5;

Fig. 18 is a front view of the head-rest having the head-rest support clamp shown in section, the section being taken along line 18—18 of Fig. 1;

Fig. 19 is a side view of the head-rest and head-rest support showing in section its mounting on the back frame 92;

Fig. 20 is a side view of the head-rest support having the upper portion cut away to disclose a side view of the adjusting means;

Fig. 21 is a vertical sectional view of the head-rest support, the section being taken along line 21—21 of Fig. 20; and

Fig. 22 is a horizontal sectional view showing the joint construction used in securing the horizontal rod 134 to the frame 92, the section being taken along line 22—22 of Fig. 5.

Briefly this invention comprises a dental operating chair constructed basically of a tubular aluminum alloy to provide a structure of high strength, but one of relative light weight. The structure has its components pivotally mounted about a centralized pivot means so that they may be folded together into a compact structure which when taken in conjunction with its light weight may be easily transported from one field position to another and there readily assembled for field dental service. To adapt this chair for dental use it is understood that it must be adjustable with respect to height and degree of tilt, with a bracket secured to the chair for receiving a cuspidor of any standard make. For the comfort of the patient the chair is provided with a two-way adjustable headrest, arms and a foot-rest. To prevent the chair from having what may be termed dead weight, the seat is so designed that its supporting structure is incorporated within its arms.

For a detailed description of the present invention, reference is made to the drawings in which as shown in Figs. 1, 2 and 3 the numeral 10 designates a tubular rod passing through the chair below its seat section, and having a plurality of tubular sleeve sections 12, 14 and 16, best shown in Fig. 3, pivotally mounted on the rod 10. A pair of legs 18 are rigidly secured to the sleeve section 14 intermediate a pair of legs 20 rigidly secured adjacent to the outer edges of the sleeve 12 and 16 with a pair of outwardly bowed bracer members 22 secured to the inner edges of the sleeves 12 and 16. The legs 18 (Fig. 3) depend downwardly from the tubular sleeve 14 in a parallel relation to each other to a point intermediate their ends where they flare out to form a pair of widely spaced rear leg supports for the chair interconnected by a tubular rung 24 extending between the legs adjacent to their lower ends; while the legs 20 depend from their supporting pair of tubular sleeves 12 and 16 with a slight divergence to form a pair of similarly widely spaced front leg supports for the chair interconnected by a tubular rung 26 extending between the legs. The rung 26 is parallel to rung 24 and is connected to rung 24 by an interconnecting means including a pair of spaced bars 28 (Fig. 4) pivotally connected at one end by bolts 30 to a pair of ears 32 rigidly secured to the rung 26 and having their opposite ends pivotally connected to a corresponding pair of bars 34 by bolt 36 extending between the pairs of bars 28 and 34. The bars 34 have their opposite ends pivotally connected by bolts 40 to a pair of ears 38 rigidly secured to rung 24. A hook means 42 (Fig. 1) is carried by the tubular rod 10 and depends therefrom to a position where it may hook the pivot bolt 36 carried by the bars 28 and

34 interconnecting the leg rungs 24 and 26, to maintain the legs in their drawn position as shown by the dotted lines in Fig. 1 when the pivots formed by the bolt 36 are broken upwardly drawing the legs together.

Chair support

A pair of vertical standards 44 (Figs. 5 and 6) having upper ends and lower ends with a plurality of corresponding passages 100 intermittently spaced on upper portions thereof are secured at their lower ends to a pair of offsets 46 secured to the outer extremities of the tubular rod 10 by bolts 48 which extend through the said vertical standards, offsets and rod. As shown in Fig. 5 a tubular cross rod 50 extends between the standards intermediate their upper and lower ends and is provided with bushings 58 (Fig. 17) secured within the tubular rod adjacent to its ends by bolts 56 and adapted to receive bolts 54 passing through clamps 52 carried by the standards, and the standards thereby connecting the rod 50 to the standards 44. The tubular cross rod 50 carries a tubular T-member 60 having its horizontal member 62 pivotally connected to the cross rod between a pair of collars 64 and its vertical member 66 having a horizontal passage 68 adjacent to its lower end depending from the said horizontal member where it coacts with an inverted tubular T-member 70 (Figs. 1 and 3) having its horizontal member 72 extending between a pair of tubular collars 74 with which it is pivotally connected to the rear legs 18 by bolt 76, and its vertical member 78 of smaller diameter than the vertical member 66 of T-member 60 with a plurality of corresponding spaced passages 80 whereby in the assembling of the chair it slides within the said vertical member 66 to a desired position and there locked with a pin 82 which is inserted through the aligned passages 80 and 68 of the vertical members to provide the chair with a means for adjusting its angle of tilt. The pin 82 is provided at one end with a small section 84 which is frictionally aligned with the body of the pin 82 for insertion, but which may be pivoted about a friction joint 86 to a crosswise position thereby preventing the pin from being accidentally withdrawn, and at its other end with a chain 88 having its free end secured to the bolt 76. The inverted T-member 70 in its inoperative state as shown in Fig. 3 is pivoted downwardly until its end having a spring bearing 90 engages a corresponding socket provided therefor in the tubular rung 24 locking the T-member 78 to the rung 24.

Back component

Referring again to Figs. 1, 2 and 6 in which there is shown an inverted U-shaped tubular frame 92 supporting a back 94 in front of the vertical standards 44 on which it is slidably mounted by a plurality of sleeves 96 and 98 rigidly secured to the frame 92 by bolts 102. The standards 44 being provided with a plurality of corresponding vertically spaced passages 100 extending downwardly from their upper ends through which as shown in Fig. 7 pins 104 passing through sleeves 98 may be selectively inserted provides a locking means and a means for adjusting the height of the chair assembly including the seat and back secured to the frame 92. The pins 104 pass through housings 106 secured to sleeves 98 and house stops 108 carried by the pins 104 for imparting forward motion to the pins 104 by springs 110 having ends abutting the stops 108 and opposite ends abutting the rear of the housings 106. The rear end of the pins 104 are pivotally secured by bolts 112 to arms 114 connected in a spaced relation to a pivot point 116 of a lever 118 pivotally secured through the pivot point by a screw 120 to a boss 122 secured to the chair back 94. The arms 114 are so disposed with respect to the lever 118 that when it is rotated about the pivot point 116 from a horizontal to a vertical position the pins 104 are withdrawn from the selected passages 100 compressing the helical spring 110 which upon release of the lever drives the pins forward into corresponding passages 100 of the standards 44.

Seat component

Referring now to Figs. 15 and 16 in which is shown a U-shaped seat frame 130 carrying a seat 146 and having the ends of its parallel members rigidly secured to a tubular rod 132 extending between them. The rod 132 is pivotally secured to another tubular rod 134 by pivot ears 144 rigidly secured to rod 132. The rod 134 is

secured to the lower ends of the vertical members of the inverted U-shaped back frame 92 (Fig. 5) by bolts 136 passing through the said vertical members into bushings 138 (Fig. 22) carried by clamps 140 secured within the ends of the rod 134 by bolts 142.

To the forward tubular rod of the U-shaped seat frame 130 is pivotally connected a foot-rest 150 shown in its operative position in Fig. 8 and comprising a horizontal tubular rod 152 rigidly secured between the lower ends of two vertical tubular rods 154 having their upper ends rigidly secured to horizontal tubular sleeve members 156 pivotally mounted on the forward member of the U-shaped seat frame. The foot-rest may be adjusted in varying positions along its arc by an adjustable tubular element including a diagonal member 158 having a plurality of intermittently spaced passages 160 intermediate its ends secured at one end to a tubular sleeve 162 pivotally mounted upon the horizontal tubular rod 152 of the foot-rest 150 and in its operative position extending upwardly and rearwardly within a corresponding tubular diagonal member 164 of larger diameter than the diagonal member 158 and having one end threadedly mounted within a horizontal sleeve member 166 pivotally mounted upon the rod 132 with a passage 168 adjacent to its other end corresponding to the plurality of passages 160 on the diagonal member 158 through which a pin 170 may be selectively inserted for locking the diagonal members 158 and 164 together thereby providing a bracing element for the foot-rest 150. The pin 170 has at its forward end a section 172 held by friction joint 174 in alignment with the body of the pin 170 for insertion purposes but which may be folded crosswise to provide a means for locking the pin through the selected passages, and at its opposite end a chain 176 having its free end secured by a screw 180 to a boss 178, welded to the diagonal member 164. When the pin 170 is removed from its passages the diagonal member 164 being threadedly mounted on sleeve member 166 may be removed from the said sleeve member and slid over the diagonal member 158 to which it is then secured by the pin 170 in its inoperative position as shown in Figs. 15 and 16, thereby permitting the diagonal members to be folded rearwardly and upwardly with the foot-rest members into juxtaposition with the seat frame and maintained in that position by a spring clip 182 rigidly secured to the bottom of the seat 146.

The seat is maintained in a fixed relation to the back by a pair of detachable tubular arms 190 (Figs. 11, 12 and 13) comprising a pair of diverging horizontal tubular members 192 supported above the seat frame 130 by substantially vertical diverging members 194 formed as an integral part of the horizontal members and secured to the back frame 92 by upwardly extending members 196 formed as integral parts of the horizontal diverging members 192.

The arm members 196 as shown in Fig. 12 are secured to bushings 200, welded within the back frame 92 and having internally threaded passages adapted to receive threaded portions of bolts 202 passing through horizontal tubular arm portions 204 integral with the arm members 196. The bolts 202 at their ends opposite their threaded portions are provided with levers 206 slidably mounted through passages 208 for tightening the bolts 202 thereby rigidly securing the arms to the said back frame 92. The bolts 202 being detachable with the arms and therefore subject to becoming lost through transportation are provided with retaining means which, as shown in Figs. 12 and 14, consist of pins 210 passing through the bolts 202 in chambers 212 of the horizontal tubular arms 204 provided with passages 214 whereby access to the pins 210 may be had. The vertical diverging members 194 of the arms 140 are secured to the seat frame 130 in the same manner as were the arm members 196 to the frame 92 by bolts 216 identical in construction with the bolts 202 and having the same retaining means. The arm members 196 and 194 are provided with diagonal bracing bars 218 having ends of cuspidor brackets 220 secured thereto. The other ends of the cuspidor brackets are secured to the horizontal arm members 192 and the brackets are provided with passages 222 adapted to receive cuspidor hangers 224 as shown in Figs. 11 and 12.

Head rest and head rest support

The horizontal member of the inverted U-shaped back

frame 92 is provided with a centrally disposed tubular shaped friction clamp 232 integral therewith, as shown in Figs. 5, 6 and 19, and operable responsive to action of a clamping screw 224 for clamping a head rest support rod 238. The head rest support rod 238 is provided at its upper end with an adjustably rotating head rest clamp secured to the tubular rod 238 (Figs. 20 and 21) comprising a circular block 240 having a passage 242 extending through the block through which a standard head rest 244 of the type having a depending shaft 246 may pass. The block 240 is also provided at one end with an internally threaded passage 248 adapted to receive a threaded portion of a bolt 250 having a slidable pin 252 passing through its outer end for screwing the bolt into the internally threaded passage 248 by hand, and a washer 254 which seats within an annular recess provided therefor in a ring member 256 secured to the tubular rod 238 by a pin 257 as shown in Figs. 20 and 21. The ring 256 is provided with a plurality of semi-annularly disposed passages 258 circumscribing a recess 260 to receive a coiled spring 261. A corresponding ring 262 provided on one side with a recess adapted to receive the rod 246 and on the other side with a pin 264 adapted to be received by the passages 258 of ring 256 whereby in operation the tightening of the bolt 250 causes the washer 254 to force the rings 256 and 262 against the rod 246 while at the same time exerting a force on the block 240 tending to pull it through the rings providing thereby a clamp for the head rest rod 246. The head rest rod 246 may be tilted to a desired angle of tilt with this arrangement by loosening the bolt 250 permitting the spring 261 to separate the ring 256 from the pin 264 of ring 262 whereby it may be rotated to the desired angle of tilt and there secured by tightening the bolt 250 resetting the pin 264 within a desired passage of the ring 256.

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

1. A knocked down foldable dental chair comprising in its unfolded and assembled position two pairs of tubular parallel, diagonal supporting legs, a plurality of horizontal elements connecting said diagonal members, a pair of tubular standards supported in space by the said diagonal supporting members, the said standards having an upper end and a lower end, the said horizontal elements including a tubular rod extending between the pair of standards adjacent to their lower ends, the two pairs of diagonal supporting legs being pivotally mounted upon the said rod intermediate its ends and having one pair of legs extending forwardly and the remaining pair extending rearwardly of said rod, a second tubular rod extending between the pair of standards intermediate their ends, a third tubular rod extending between the rearwardly extending legs intermediate the ends thereof, an adjustable tubular diagonal member having one end pivotally mounted upon the second tubular rod and its other end pivotally mounted upon the third tubular rod, a stop means for locking said adjustable diagonal in a desired position, an inverted U-shaped tubular frame adjustably mounted between the pair of standards, a back carried by the said inverted U-shaped frame, stop means for locking the adjustable inverted U-shaped frame upon the pair of standards in a desired position, a fourth tubular rod extending between vertical members of the inverted U-shaped frame adjacent to their ends, an open seat frame pivotally mounted upon the said fourth rod of less width than the distance between the inverted U-shaped frame, a seat carried by the said seat frame, a pair of detachable triangular shaped tubular arms having ends of their hypotenuses connected to the inverted U-shaped frame at a point intermediate the ends of its vertical members and the horizontal member of the U-shaped frame interconnecting the vertical members of the said frame, the said arms having opposite ends connected adjacent to the forward edge of the open seat frame, a lower extending tubular foot rest pivotally mounted upon the forward edge of the seat, a second adjustable diagonal member having one end pivotally mounted upon the foot rest and its other end pivotally mounted upon the fourth tubular rod, stop means for locking the second adjustable diagonal member in a desired position, and a two-way adjustable head rest mounted upon the horizontal member of the inverted U-shaped member, the first-mentioned adjustable member being secured to the second tubular rod connected to the standards and the third tubular rod connected to the rearwardly extending legs providing a means for tilting the chair rearwardly, while the inverted U-shaped frame carrying the back and seat being adjustably mounted upon the said pair of standards provides a means for adjusting the height of the seat with respect to the supporting legs.

2. A knocked down and foldable dental chair comprising in its unfolded position two pairs of parallel, diagonal supporting legs, a plurality of horizontal elements connecting said diagonal members, a pair of standards supported in spaced relation by the said diagonal supporting members, the said standards having an upper end and a lower end, the said plurality of horizontal elements including a rod extending between the pair of standards adjacent to their lower ends, the two pairs of diagonal supporting legs being pivotally mounted upon the said rod intermediate its ends and having one pair of legs extending forwardly and the remaining pair extending rearwardly of said rod, a second rod extending between the pair of standards intermediate their ends, a third rod extending between the rearwardly extending legs intermediate the ends thereof, and an adjustable diagonal member having one end pivotally mounted upon the second rod and its other end pivotally mounted upon the third rod, a stop means for locking said adjustable diagonal in a desired position, an inverted U-shaped frame adjustably mounted between the pair of standards, a back carried by the said inverted U-shaped frame, stop means for locking the adjustable inverted U-shaped frame upon the pair of standards in a desired position, a fourth rod extending between vertical members of the inverted U-shaped frame adjacent to their ends, an open seat frame pivotally mounted upon the said fourth rod of less width than the distance between the inverted U-shaped frame, a seat carried by the said seat frame, a pair of attachable triangular shaped arms having ends of their hypotenuses connected to the inverted U-shaped frame at a point intermediate the ends of its vertical members and the horizontal member of the inverted U-shaped frame interconnecting the vertical members of the said frame and opposite ends connected adjacent to the forward edge of the open seat frame, a lower extending foot rest pivotally mounted upon the forward edge of the seat, a second adjustable diagonal member having one end pivotally mounted upon the foot rest and its other end pivotally mounted upon the fourth rod, stop means for locking the second adjustable diagonal member in a desired position, and a two-way adjustable head rest mounted upon the horizontal member of the inverted U-shaped member, the first-mentioned adjustable member being secured to the second rod connected to the standards and the third rod connected to the rearwardly extending legs providing a means for tilting the chair rearwardly, while the inverted U-shaped frame carrying the back and seat being adjustably mounted upon the said pair of standards provides a means for adjusting the height of the seat with respect to the supporting legs.

3. A knocked down foldable dental chair comprising two pairs of parallel supporting legs, a plurality of horizontal elements connecting the said parallel supporting legs, pivot joints intermediate the ends of the plurality of horizontal elements, a pair of standards supported in space by the said supporting legs, the said standards having upper ends and lower ends, the lower ends being provided with rearwardly extending offsets, a rod extending between the offsets adjacent to their rearwardly extending ends, the two pairs of supporting legs pivotally mounted upon the said rod, means for fixing the degree of tilt of the standards, a back frame adjustably mounted upon the standards, a back carried by said back frame, a seat frame pivotally mounted upon the back frame, a seat carried by the seat frame, detachable means for locking the seat in a fixed position with respect to the back, a foot rest pivotally connected to the seat frame, means for locking the foot rest in a selected position, the said supporting legs being pivotally connected to the said rod secured to the rearwardly extending offsets interconnecting the standards and rod so as to permit the legs to be folded into an overlying position with the standards, the foot rest being pivotally connected to the forward edge of the seat frame so as to permit the foot rest to be folded rearwardly into the seat frame, and the seat frame, upon removal of the detachable means for fixing the position of the seat with respect to the back, being pivotally connected to the back frame so

as to permit the seat and foot rest to be folded into an overlying position with the back frame carried by the standards to form a compact knocked down and unassembled foldable chair which can be readily unfolded and assembled for use.

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