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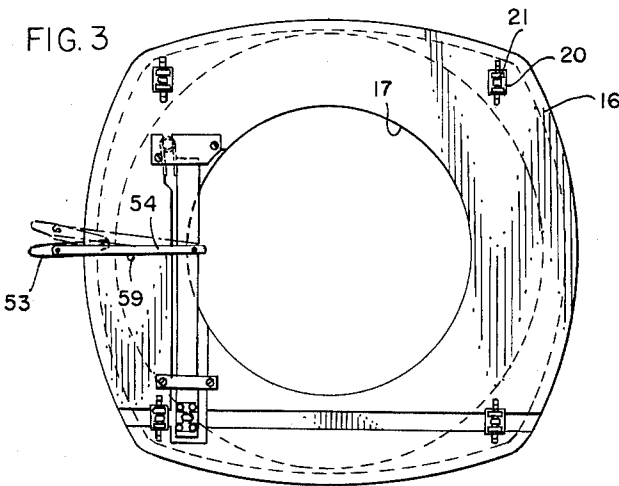
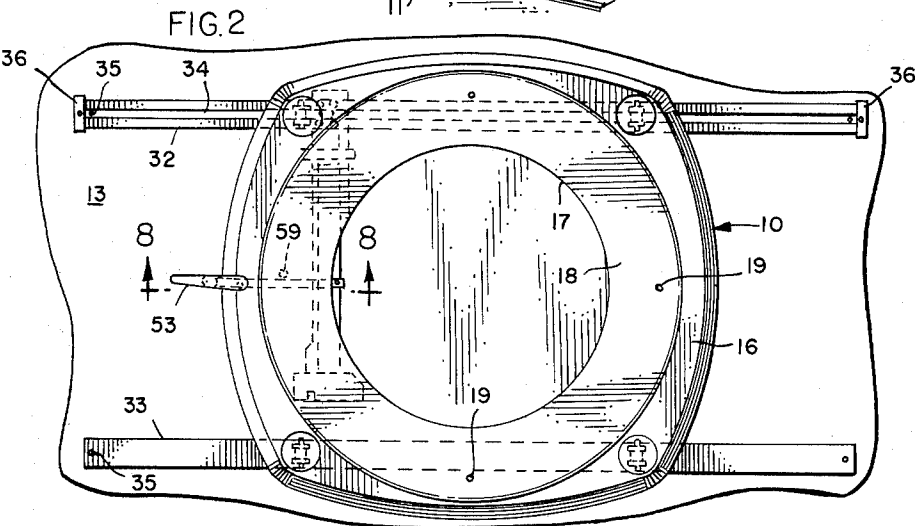
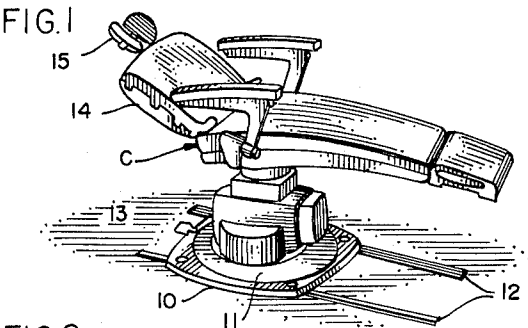
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MOVABLE SUPPORT FOR DENTAL CHAIRS

Filed May 17, 1965

2 Sheets-Sheet 1



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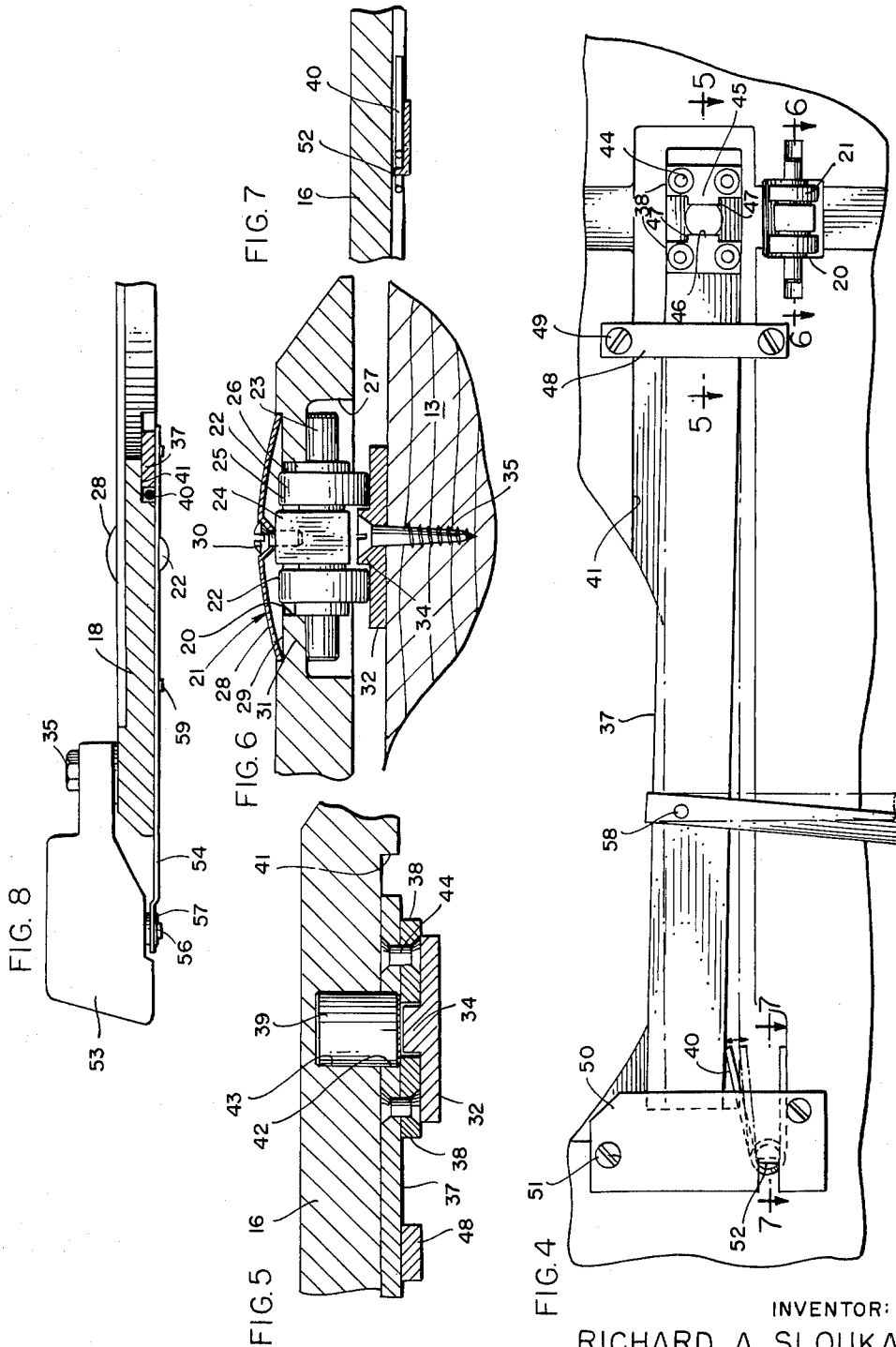
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MOVABLE SUPPORT FOR DENTAL CHAIRS

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This invention relates to a support for dental chairs, and more specifically, to a device which permits limited horizontal movement of a dental chair into selected positions upon a floor surface.

It is becoming an increasingly frequent practice for dentists to perform certain, if not all, dental operations while the dentist as well as the patient is in a seated position. Such an operating procedure requires that the patient's chair be tipped back farther than required for the prior standing operating technique, with the head of the patient 30 inches or less from a floor surface. While conventional dental chairs are capable of such tipped-back positioning, many dentists who prefer to work in a seated position find that it requires a different location of the patient's chair as a whole, so that the dental console and the instruments supported thereby will be readily accessible to the dentist, and so that the mouth-rinsing devices will be easily available to the patient.

Accordingly, it is an object of the present invention to provide a support for dental patient chairs which permits such a chair to be moved over a floor surface into selected positions most convenient for the dentist, whether he prefers to operate in a seated position, as during oral surgery, or in the more traditional standing position. In either case, the patient's chair may be located where the dental tools are in easy reach of the dentist, and the cuspidor and other appropriate devices are accessible to the patient, should the patient be in an upright or in a reclining position.

Another object is to provide a movable support for dental chairs which is extremely flat and which therefore, when added to a conventional dental chair, elevates that chair only slightly. The flatness of the unit is an important consideration for a dentist who prefers to work in a seated position, since any added support beneath the base of the chair must not elevate the chair or the patient above a practical operating level.

A further object is to provide a movable chair support which contains within its substantially flat construction an effective locking mechanism for securely anchoring the support and chair in any of a variety of locations along a floor surface. In this connection, it is a specific object to provide a chair support with positive locking means for firmly and securely fixing a chair in a selected position without danger that the chair might be unintentionally shifted in either horizontal direction during delicate dental procedures.

A still further object is to provide a dental chair support which contains a positive locking mechanism capable of self-adjustment because of wear. Another object is to provide a locking mechanism which is compact, is fully enclosed or covered by the flat support plate, and is easily manipulated by a foot pedal readily accessible to the dentist.

Other objects will appear from the specification and drawings in which:

FIGURE 1 is a perspective view illustrating a dental chair mounted upon the movable support means of the present invention;

FIGURE 2 is a top plan view of the support mounted upon a floor surface;

FIGURE 3 is a bottom plan view of the support;

FIGURE 4 is an enlarge fragmentary view of the clamp-

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ing or locking mechanism viewed from the underside of the support as in FIGURE 3 but illustrating the mechanism in locking position;

FIGURE 5 is a further enlarged fragmentary sectional view taken along line 5-5 of FIGURE 4;

FIGURE 6 is a sectional view on the same scale as FIGURE 5 but taken along line 6-6 of FIGURE 4;

FIGURE 7 is a fragmentary sectional view in the scale of FIGURE 4 and taken along line 7-7 of FIGURE 4;

FIGURE 8 is a vertical sectional view on substantially the same scale as FIGURE 4 and taken along line 8-8 of FIGURE 2.

Referring to the drawings in greater detail, FIGURE 1, illustrates the support 10 of the invention in installed condition beneath a standard dental chair C. The base 11 of the chair rests directly upon the support and the support is in turn carried by track means 12 affixed to a floor surface 13. The chair C has the usual adjustable backrest 14 and headrest 15, the headrest and backrest being illustrated in intermediate positions of adjustment. If the dentist intends to stand while treating the patient, backrest 14 would in most instances be more nearly upright than the position illustrated, whereas if the dentist prefers to work in a seated position, the backrest would normally be tipped back even farther. In either case, the dentist performs many of his operations from a position behind the patient; therefore, the angular position of the backrest would have a substantial effect on the accessibility to the dentist of instruments supported by a stationary dental console (not shown), usually located to one side of the dental chair, if it were not for the support 10 which permits movement of the chair as a whole.

The movable chair support 10 comprises a flat plate 16 preferably cast from aluminum or other metal having at least equal strength and durability. In general outline, plate 16 is of modified rectangular shape with its side edge portions bowed outwardly and beveled. An enlarged opening 17 is provided in the center of the plate and, if desired, the top surface about opening 17 may be provided with an annular depression 18. The maximum diameter of the depression 18 is sufficient to accommodate the largest circular base of the various commercially-available dental chairs and the purpose of the depression is to maintain the base of such a chair as close as possible to floor surface 13. Since opening 17 is smaller than the diameter of the smallest commercially-available chair base, plate 16 is adapted to support chairs of a wide variety of base sizes upon the planar surface of depression 18. Threaded holes 19 may be provided in the top of the plate within depressed area 18 for securely anchoring a chair base in position upon the support.

The undersurface of the support plate is planar, except for grooves or recesses to accommodate the locking mechanism as will be described hereinafter. In the corner areas of the plate are a plurality of rectangular openings 20 for receiving the wheel or roller assemblies 21. As shown most clearly in FIGURE 6, each wheel assembly comprises a pair of rollers 22 journaled upon an axle shaft 23. The shaft passes through a mounting block 24 which is disposed intermediate the ends of the shaft and positioned between the spaced rollers 22. Anti-friction washers 25 may be provided between the rollers and the mounting block, and similar washers 26 may be positioned outside of the rollers upon the shaft. Shaft 23 has end portions which project outwardly beyond rollers 22 and washers 26 and which are received within lateral recesses 27 provided in the under-surface of the plate. A capping disk 28 is fitted within a slight annular depression 29 about opening 20 and is centrally apertured to retain the head of a connecting screw 30 threaded into mounting

block 24. Thus, screw 30 clamps shaft 23 and capping disk 28 in tight engagement with opposite sides of flange or shoulder portions 31 of the support plate. The rollers are proportioned and mounted so that they project downwardly beneath the undersurface of the plate, as illustrated in FIGURE 6.

In the illustration given, the track means upon which the rollers ride comprises a pair of parallel rails 32 and 33 (FIGURE 2). The rails are in the form of metal strips, and at least one of the rails is provided with an upstanding longitudinal center rib 34. The other rail 3 has no rib as shown; however, it is to be understood that, if desired, both rails may have the ribbed cross sectional configuration of rail 32, as indicated in FIGURES 5 and 6. The rails are shown as being secured directly to a floor surface by screws 35, an arrangement which is preferred where a permanent installation of the support 10 and dental chair C is desired, and especially where the dentist's office is uncarpeted. Where it is anticipated that the mounting of the chair will not be permanent, and particularly if the office is carpeted, it may be preferable to secure the rails 32 and 33 to a flat metal mounting plate, or to form such rails integrally with the plate, so that repositioning of the chair at a later date may be more easily achieved.

Referring to FIGURES 2 and 6, it will be observed that rollers 22 ride directly upon rails 33 and 32 with the upstanding longitudinal rib 34 of rail 32 being disposed between the paired rollers. The width of the rib is slightly less than the distance between the rollers of each pair and serves as a guide to direct movement of the rollers along the rail. Even where only one of the rails 32 is provided with rib 34, it will be noted that two sets of rollers are guided by the rib; therefore, the support plate is securely restrained against all horizontal movement except in directions longitudinally of the parallel rails. The extent of such longitudinal movement is limited by stop bars 36 (FIGURE 2) at the ends of at least one of the rails, the stop bars projecting at least as high as rib 34 and preventing rollers 22 from traveling beyond the limits of the rail.

The means for securely locking the support plate 16 in any selected position along rails 32 and 33 is illustrated most clearly in FIGURES 4 and 5 and essentially comprises a flat, elongated locking bar 37, a pair of clamping jaws 38 secured to the bar adjacent one end thereof, a pivot shaft 39 for pivotally supporting the bar, and a spring 40 for pivoting the bar into a normally locked or clamped position.

Bar 37 is disposed beneath support plate 16 within an elongated recess 41 formed in the plate's undersurface. The flat elongated bar extends horizontally and in a direction generally transversely with respect to rails 32 and 33 and with regard to the path of movement of the support. One end of the bar overlies rib-providing rail 32 and is provided with an opening 42 directly above the rib 34. The underside of the plate is formed with a socket 43 in register with bar opening 42 and pivot shaft 39 connects the bar and plate for pivotal movement of the bar about a vertical axis passing through the longitudinal midline of the rib.

Clamping jaws 38 are secured to the underside of the bar on opposite sides of rib 34 by means of rivets 44 or by any other suitable connecting means. It will be observed from FIGURE 4 that the spaced clamping jaws are provided with opposing, inwardly directed extensions 45 of generally rectangular shape. The opposing surfaces 46 of the extensions are spaced apart a distance slightly greater than the width of rib 34, so that when such surfaces are parallel, or substantially parallel, with the sides of the rib there is no engagement between the rib and such extensions and the clamping jaws are therefore in unclamped positions. However, when the bar 37 is pivoted to position surfaces 46 of the jaws at angles with respect to the side surfaces of the rib, one of the corners 47 of

each jaw extension 45 will forcefully engage the sides of the rib 34 and will lock the support against movement in either direction along the rails.

The force for maintaining the locking bar and clamping jaws in clamped condition is supplied by spring 40 which is mounted within recess 41 and which bears against the opposite end of the bar to pivot the bar in a clockwise direction into the normally locked position illustrated in FIGURE 4. Because of the substantial length of bar 37, the moment of force exerted by spring 40 about pivot shaft 39 and applied by clamping jaws 38 to opposite sides of rib 34 is substantial, and is more than adequate to firmly and securely hold the support and a dental chair carried thereby against horizontal movement along the parallel rails.

The clamping or locking bar is supported in position within recess 41 by strap 48, which spans the recess adjacent the clamping jaws and is secured to the plate by screws 49, and by plate 50 which supports the free end of the bar and is similarly secured to the plate by screws 51. Plate 50 also retains spring 40 in position and, for that purpose, may be provided with an upstanding tab or ear 52 received within the eye of the spring (FIGURE 7).

The clamping bar 37 is thereby held in position against the recessed underside of support plate 16. Referring to FIGURE 5, it will be noticed that the diameter of pivot shaft 39 is greater than the width of rib 34 and the spacing between clamping jaws 38. Since the clamping jaws are securely connected to the bar 37, and the bar is in turn snugly but movably held in position against the undersurface of the plate 16, the clamping jaws perform the additional function of maintaining pivot shaft 39 in place.

A foot pedal 53 and link 54 are mounted upon the plate for shifting the bar 37 and clamping jaws 38 into unclamping positions. Referring to FIGURES 2, 3 and 8, the pedal 53 projects outwardly and rearwardly from the plate and mounted for movement about a vertical axis by means of screw 55 threaded into the plate from the top peripheral surface thereof. The outer portion of the pedal is in the shape of a vertically extending fin, with its vertical and longitudinal dimensions being substantially greater than its transverse dimension. With a simple movement of his toe, a dentist may urge the pedal 53 in either of two lateral directions and into either the releasing or unclamping position illustrated in solid lines in FIGURES 2 and 3, or into the clamping position illustrated in broken lines in FIGURE 3. Link 54 is pivotally connected to the pedal at a point outwardly of pivot screw 55, the outer end of the link being carried by a stub shaft 56 projecting downwardly from the pedal. The apertured link may be maintained upon the stub shaft by a C-ring 57 or by any other suitable connecting means. The opposite end of the link is pivotally connected to bar 37 by means of rivet 58.

When the link 54 and pedal 53 extend along substantially the same vertical plane (i.e., when the pedal is in a substantially dead center position), bar 37 is in a rearwardly-pivoted unclamping position. The bar may be maintained in such a position by simply urging the pedal to the left, in a clockwise direction as viewed in FIGURE 4, until link 54 is displaced slightly laterally of the pivot axis of the pedal and engages stop pin 59. The force of spring 40 tends to hold the pedal and link in the slightly off-center unclamping position since its tension has been relieved slightly by the lateral displacement of the link. However, the angular position of the bar 37 when the pedal and link are held in their slightly off-center positions is insufficient to bring the edges 47 of clamping jaws 38 into engagement with the sides of rib 34.

To clamp the support in a selected position along the rails, pedal 53 is simply nudged to the right (in a counter-clockwise direction as viewed in FIGURE 2) until the pedal and link pass beyond a position of longitudinal alignment and the force of spring 40 then pivots the bar into the clamping position previously described.

As already mentioned, the effectiveness of the clamping mechanism in securely holding the support plate in place results to a considerable extent from the length of the lever arm provided by the clamping bar and the highly localized area of contact between the clamping jaws and the rib of rail 32. Over an extended period of time, some wear of the clamping jaws will necessarily occur but, despite such wear, the clamping force applied by the jaws will remain substantially constant because spring 40 automatically adjusts for the difference by pivoting the bar to a greater extent into its locking position. In other words, the clamping mechanism is substantially self-adjusting to maintain a substantially uniform clamping force despite the wear occasioned by extended use. Furthermore, since the clamping force is exerted only by the spring, there is no danger that improper manipulation of the pedal will result in the development of excessive clamping forces which might damage the parts.

While in the foregoing I have disclosed an embodiment of the invention in considerable detail for purposes of illustration, it will be understood by those skilled in the art that many of these details may be varied without departing from the spirit and scope of the invention.

I claim:

1. A support for dental chairs comprising a flat plate adapted to support the base of a dental chair thereon, a plurality of rollers mounted on the underside of said plate and supporting said plate for movement over a floor surface, track means adapted to be secured upon a floor surface for guiding movement of said plate therealong, said track means including a rail having an upstanding longitudinal rib providing parallel lateral surfaces along opposite longitudinal sides thereof, a horizontal clamping member disposed beneath said plate and equipped with a pair of clamping jaws positioned on opposite sides of said rib, said clamping member being pivotally mounted to said plate for horizontal pivotal movement about a vertical pivot axis disposed between said jaws and passing through said rib, the horizontal distance between said jaws being slightly greater than the width of said rib for unrestrained horizontal movement of said plate along said rail when said member is pivoted into an unlocking position, said jaws being engageable with the lateral surfaces along opposite sides of said rib when said member is pivoted into a locking position, and pedal means provided by said plate and operatively associated with said member for pivoting said member horizontally between locking and unlocking positions.

2. The structure of claim 1 in which said rail is of inverted T-shaped cross sectional configuration, at least two of the rollers provided by said plate being arranged in a spaced pair supported upon said rail along opposite sides of said rib for guiding movement of said plate along said rib.

3. The structure of claim 2 in which stops are provided by said track means adjacent opposite ends of said rib for engaging said rollers and limiting the extent of longitudinal movement of said plate.

4. A support for dental chairs comprising a substantially flat plate adapted to support a dental chair thereon, a plurality of rollers mounted on said plate and supporting the same for movement over a floor surface, track means adapted to be secured to a floor surface for engagement by said rollers and for guiding movement of said plate therealong, said track means including a rail having an upstanding longitudinal rib providing parallel lateral surfaces along opposite longitudinal sides thereof, a horizontal clamping bar disposed beneath said plate and equipped with a pair of spaced depending clamping jaws disposed on opposite sides of said rib, said clamping bar being pivotally mounted to said plate for horizontal pivotal movement about a vertical pivot axis disposed between said jaws and passing through said rib,

said jaws being spaced apart a distance slightly greater than the width of said rib to permit unrestrained horizontal movement of said plate along said rail when said bar is pivoted into an unlocking position and being engageable with the lateral surfaces along opposite sides of said rib when said bar is pivoted into a locking position, spring means spaced substantially from said pivot axis and said jaws and being connected to said plate and said bar for urging said bar into said locking position, whereby, said plate is normally locked against movement along said rail by the force exerted upon said clamping bar by said spring means, and pedal means mounted upon said plate and operatively associated with said bar for pivoting the same into said unlocking position in opposition to the force exerted by said spring.

5. The structure of claim 4 in which said pedal means comprises a pedal mounted upon said plate adjacent the periphery thereof for pivotal movement about a vertical axis spaced from said bar, and a link connecting said pedal to said bar for urging said bar into said unlocking position when said pedal is pivoted in one direction.

6. The structure of claim 5 in which said link is connected to said pedal at a point between the free end of the pedal and the pivotal axis of the same and is connected to said bar intermediate the ends thereof, said pedal when in substantially longitudinal alignment with said link being effective to hold said bar in said unlocking position, and stop means provided by said plate and engageable with said link to limit movement of said pedal in said one direction and to hold the same in a position slightly out of longitudinal alignment with said link while at the same time maintaining said bar in an unlocking position, the force of said spring means acting upon said bar to retain said pedal in said one position until a force in excess of the spring force pivots the pedal in an opposite direction beyond a point of alignment with said link.

7. The structure of claim 4 in which at least two of the rollers provided by said plate are arranged in a spaced pair disposed along opposite sides of said rib and supported upon said rail.

8. The structure of claim 7 in which stops are provided by said rail adjacent opposite ends of said rib for engaging the rollers supported by said rail and for limiting the extent of longitudinal movement of said plate.

9. A support for dental chairs comprising a flat plate adapted to support a dental chair thereon, a plurality of rollers mounted on the underside of said plate and supporting said plate for movement over a floor surface, track means adapted to be secured to a floor surface for guiding movement of said plate therealong, said track means including a rail having an upstanding longitudinal rib provided with parallel lateral surfaces along opposite longitudinal sides thereof, a horizontally-elongated clamping bar disposed beneath said plate and being equipped adjacent one end thereof with a pair of spaced clamping jaws disposed on opposite sides of said rib, said clamping bar being pivotally mounted to said plate for horizontal pivotal movement about a pivot axis disposed between said jaws and passing through said rib, the distance between said jaws being slightly greater than the width of said rib to permit unrestrained horizontal movement of said plate along said rail when said bar is pivoted into an unlocking position, said jaws being engageable with the lateral surfaces along opposite sides of said rib when said bar is pivoted into a locking position, a spring connected to said plate and operatively associated with the opposite end of said bar for normally urging said bar into said locking position, and means provided by said plate adjacent the periphery thereof for selectively urging said bar into said unlocking position in opposition to the force exerted by said spring.

10. The structure of claim 9 in which said jaws are provided with opposing extensions defining vertical edges forceably engageable with the lateral surfaces of said rib when said bar is pivoted into its locking position.

11. The structure of claim 9 in which at least two of the rollers of said plate are arranged in a spaced pair supported upon said rail along opposite sides of said rib and for maintaining said jaws in operative relationship with respect to said rib.

12. The structure of claim 11 in which stops are provided by said rail adjacent opposite ends of said rib for engaging said pair of rollers and for thereby, limiting the extent of longitudinal movement of said plate along said rail.

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