(No Model.) 2 Sheets—Sheet 1.

E. T. STARR.

DENTAL CHAIR.

No. 490,516. Patented Jan. 24, 1893.

Fig. 1.

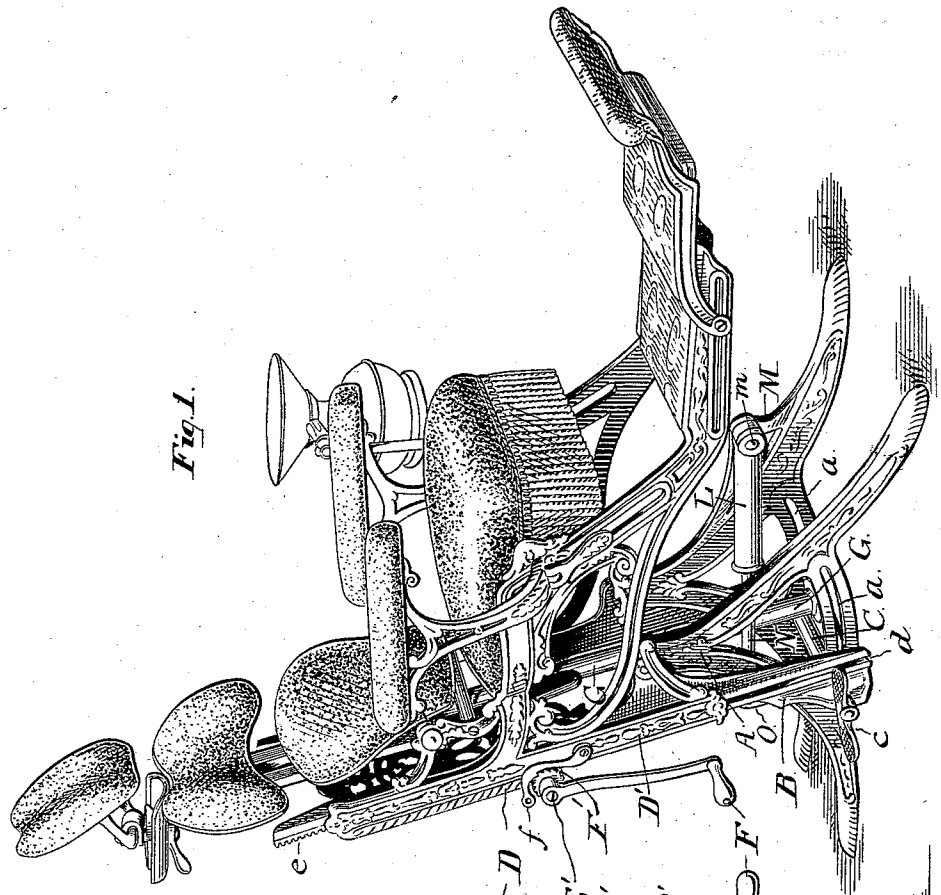
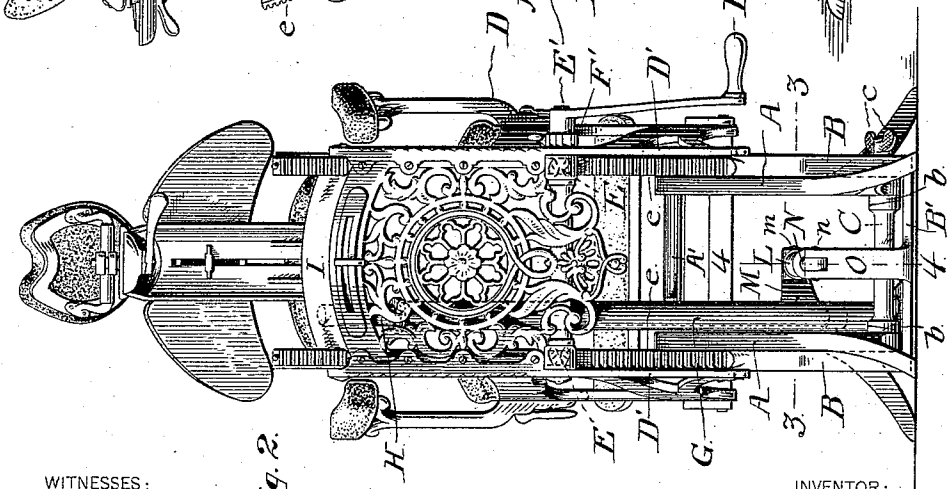


Fig. 2.



WITNESSES:

Edw. F. Simpson, Jr.

Arthur C. Clarke.

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(No Model.)

2 Sheets—Sheet 2.

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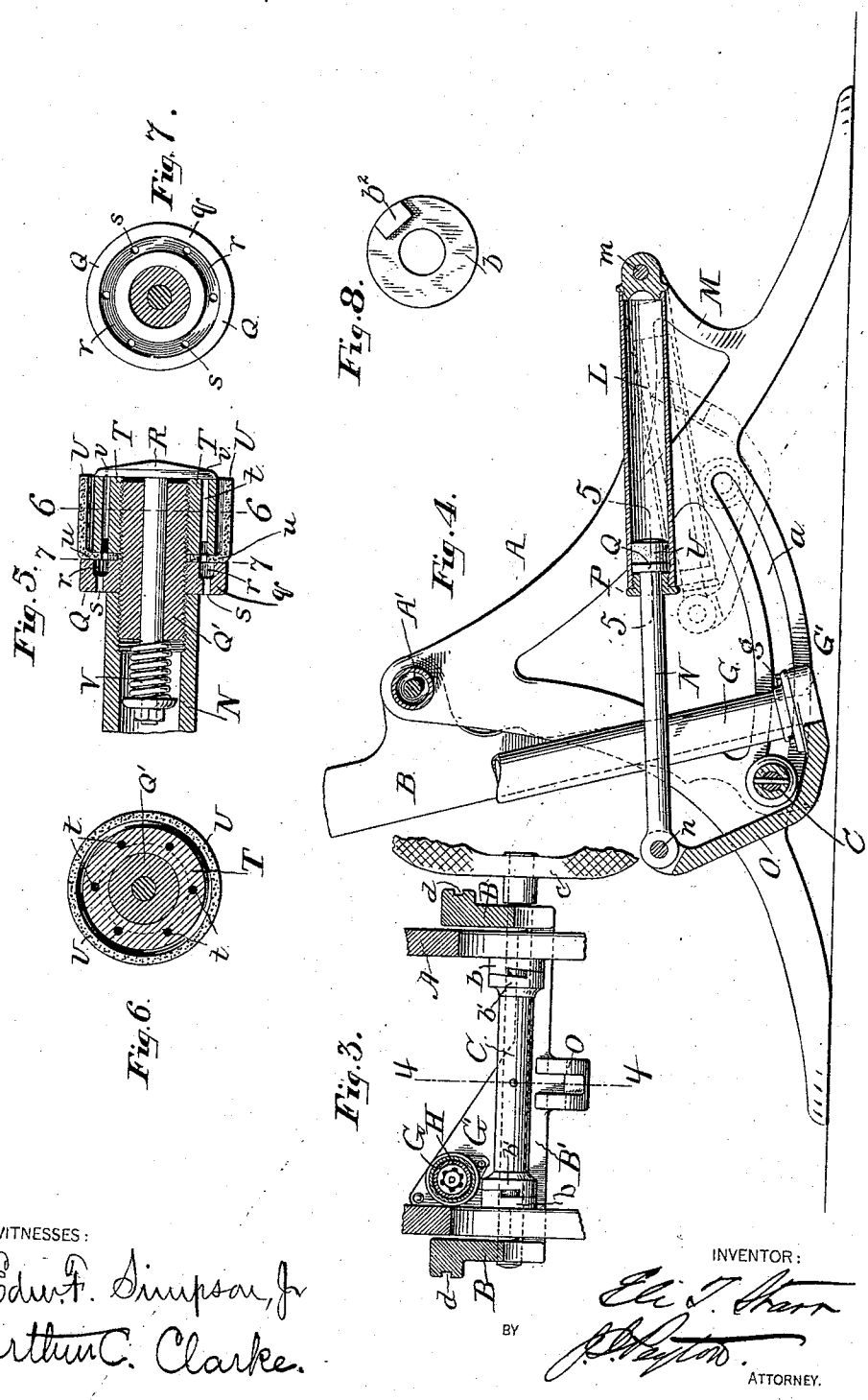

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UNITED STATES PATENT OFFICE.

ELI T. STARR, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE S. S. WHITE DENTAL MANUFACTURING COMPANY, OF SAME PLACE.

DENTAL CHAIR.

SPECIFICATION forming part of Letters Patent No. 490,516, dated January 24, 1893.

Application filed February 14, 1890. Serial No. 340,402. (No model.)

To all whom it may concern:

Be it known that I, ELI T. STARR, of the city and county of Philadelphia, in the State of Pennsylvania, have invented a certain new and useful Improvement in Dental Chairs, of which the following is a specification.

My invention relates to an improvement, as hereinafter claimed, applicable to dental chairs of the class in which the chair frames or bodies are carried by and vertically adjustable upon tilting standards rocking about jointed connections with bases or pedestals; and my invention particularly relates to that type of this class of chairs represented in United States Letters Patent No. 369,295, granted to James B. Morrison, dated August 30, 1887.

My object is to provide efficient, automatically acting, and economic means, whereby, in rearwardly inclining or tilting the chair frame or body, the movements imparted to it are gradual, thus avoiding shocks and strains.

The accompanying drawings show my improvement as applied to a chair such as that shown in the before-mentioned patent No. 369,295, and in some respects similar to that represented in reissued Letters Patent of the United States, No. 7,687, granted to James B. Morrison, May 15, 1877.

In the drawings, Figure 1 is a view in perspective, and Fig. 2 a rear elevation of a complete chair embodying my improvement. Fig. 3 is a view, on an enlarged scale, partly in plan and partly in horizontal section on the line 3, 3, of Fig. 2, with portions broken away, showing in part means for locking the chair frame in the position to which it may be inclined, and for retarding, or rendering gradual its descent; Fig. 4 is a view partly in side elevation, and partly in vertical section on the lines 4 of Figs. 2 and 3, showing particularly the mechanism for retarding or rendering gradual the backward tilting movement of the chair frame; Fig. 5 a horizontal section, on a still larger scale, on the line 5 of Fig. 4; Fig. 6 a transverse section on the line 6 of Fig. 5; and Fig. 7 a similar section on the line 7 of Fig. 5. Fig. 8 shows, detached, one of the loose disks of the clamping mechanism for locking the chair standards against tilting movement.

The base for supporting the chair consists of two side frames A A, each having two legs or feet. These frames project upwardly between their feet and are connected at or near their tops by a rod A′ by which they are allowed a pivotal or rocking movement independently of each other in order that the base may be self-adjusting to rest properly upon an irregular floor. Below their jointed connection the side frames of the base are each provided with a curved slotted bar or cross-piece *a* connecting their legs. The slots of the cross-pieces are curved in the arc of a circle of which the pivot bolt A′ is the center.

Upwardly projecting parallel side standards or supporting bars B B are suitably connected with each other by two cross-bars one of which, B′, connects them at their lower ends, while the other (not shown) connects them at a point above the pivot bolt A′. Near their lower ends the standards are jointed to a rock shaft C, at opposite sides of and outside of the base. This rock shaft projects through the slots of the cross-bars *a* of the base. Near the ends of the rock shaft are loosely mounted friction plates or disks *b b* with their outer surfaces bearing against the respectively adjacent sides of the base, and having inclined or cam-like inner surfaces. Inside of these friction disks and upon the rock shaft, are collars or fixed disks *b′ b′* with their outer surfaces inclined or cam-like, and arranged to bear against the adjacent or inner surfaces of the loose disks *b b*. Each of the loose disks is provided with a projection b^2 upon its outer surface for entering the slots in the cross-pieces *a a* of the base, whereby turning movement of the loose disks is prevented. It will be seen that by turning the rock shaft in the proper direction the friction disks may be forced outwardly against the sides of the base to firmly clamp the rock shaft against movement along the slots of the base cross pieces and thus lock the standards B against tilting movement about their pivot A′. By turning the rock shaft in the opposite direction the standards are left free to be

tilted about their pivot to the extent desired, the rock shaft sliding along the base slots during this adjustment. The rock shaft is provided with a two-armed crank or treadle-like attachment *c* by means of which it can be turned in either direction by the foot of the operator, pressure by the toe moving it one way and pressure by the heel turning it in the opposite direction. The chair frame or body D is carried by the standards B B, and partakes of the tilting movement of these standards so that it may be inclined to any desired extent. Side bars D′ D′ of the chair frame are provided with ribs which enter grooves *d d* in the standards to adapt the chair frame to be adjusted vertically by the sliding of its side bars along the standards. Pinions E E fast on a shaft E′ turning in bearings in the chair frame bars, and engaging with racks *e e* of the supporting standards are rotated by means of a crank F attached to their shaft and thus serve to elevate the chair frame. A pawl *f*, pivoted to the chair frame, is adapted to engage with a ratchet wheel F′, fast on the pinion shaft, and thus serve to hold the chair frame in its adjusted position by preventing reverse rotation of the pinions when the crank F is released.

In the operation of the well known "Morrison" chair patented as hereinbefore recited and to which the above description applies, in lowering the chair frame or body the crank of the elevating mechanism is held by the operator and its speed of revolution controlled, after tripping the pawl of the upholding or locking mechanism, to prevent too rapid descent of the chair frame and guard against its movement being too suddenly arrested upon reaching its lowermost position. In inclining the chair frame or body rearwardly, after releasing the clamping mechanism by which the chair frame is maintained in its inclined position, a considerable portion of the weight of the chair frame and the patient occupying the chair is thrown upon the operator who has to exert sufficient force to sustain this weight in adjusting the inclination of the chair preparatory to again clamping it. The greater the elevation of the chair frame and the more it is inclined backward the greater the strain upon the operator when the chair supporting standards are left free to tilt about their pivot.

Suitable fluid retarding mechanism to render gradual the descent of the chair frame is provided, the liquid reservoir G of which is mounted rigidly upon a lateral extension G′ of the cross-bar B′ of the supporting standards, while the piston or plunger H, the lower end or head of which reciprocates in the reservoir, is rigidly connected at its upper end with the cross piece I of the chair frame. This retarding mechanism *per se* is substantially the same as that shown in United States Letters Patent No. 413,156, dated October 15, 1889.

To yieldingly check or retard the backward tilting movement of the chair frame, a fluid reservoir L adapted to contain oil or other liquid, but by preference, and as in this instance, adapted for operation with air, has jointed connection at its outer end with the base by way of the projection or bracket M, a pivot *m* serving to make the jointed connection between the reservoir and base. A piston N adapted to reciprocate in the fluid reservoir has jointed connection at its outer end with the pivoted supporting standards by way of an upwardly projecting bracket O of the cross-bar B′, to which the piston is connected by the pivot *n*. A centrally open screw cap P closes the inner end of the reservoir and serves as a bearing for the piston. The piston head Q is suitably packed and is perforated and provided with a valve R adapted to seat upon the end of the piston head. The details of construction as shown in Figs. 5, 6, and 7, are as follows:—The piston rod and piston head are tubular and the head is sectional. A centrally perforated threaded coupling plug Q′ serves to connect the head to the piston. The outer face of the inner section *q* of the piston head has an annular groove *r* formed in it, from which a series of openings *s* extend to the inner face of this section. The outer section T of the head has a series of openings *t* passing through it from its outer to its inner face. Both sections of the tubular piston head are internally threaded to engage with the coupling plug by which they are secured to the piston. The packing U of cup-form is secured to the piston head by means of its inwardly projecting annular flange *u* which is clamped between the two sections of the head. The stem of the valve R passes through the coupling plug and is provided with a light or weak spring V acting with a tendency to hold the valve to its seat. The valve is provided with a series of openings *v* opposite to but much smaller than the openings *t* of the piston head.

In operation when the clamping mechanism which locks the tilting standards against movement is released, it will be seen that sudden or too rapid backward tilting movement of the standards, and consequently the chair frame, is prevented by the yielding resistance afforded to the movement of the piston in its reservoir, it being obvious that upon inward movement of the piston the valve is held closed and the passage way for fluid through the piston restricted. When the chair frame is inclined to the extent desired the clamping mechanism is adjusted to hold it in position. In inclining the chair frame by forward rock of the standards, the valve freely and automatically opens, thus allowing of this movement to the extent desired with practically no resistance by the fluid which is important as it is frequently necessary to quickly restore occupants of dental chairs from backwardly inclined to upright positions as for instance to avoid choking by flow of blood, or

the dropping of extracted teeth into the throats of patients.

Although I have illustrated and described the fluid reservoir as having jointed connection with the base, and the piston as having jointed connection with the tilting standards, it is obvious that this arrangement may be reversed by jointing the reservoir with the standards and the piston with the base.

I claim as my invention:—

The combination of the base, the tilting standards having jointed connection with the base, the chair frame carried by the standards and partaking of their tilting movements, the clamping mechanism for locking the standards to the base at the inclination to which they may be adjusted, and the fluid retarding apparatus for checking backward tilting movement of the standards while allowing them to be tilted forward quickly, said apparatus consisting of the reservoir and the piston provided with the perforated valved head reciprocating in the reservoir, the said reservoir and piston having jointed connection the one with the base and the other with the tilting standards, substantially as and for the purpose set forth.

In testimony whereof I have hereunto subscribed my name.

ELI T. STARR.

Witnesses:
J. A. B. WILLIAMS,
ROBT. E. GORDON.