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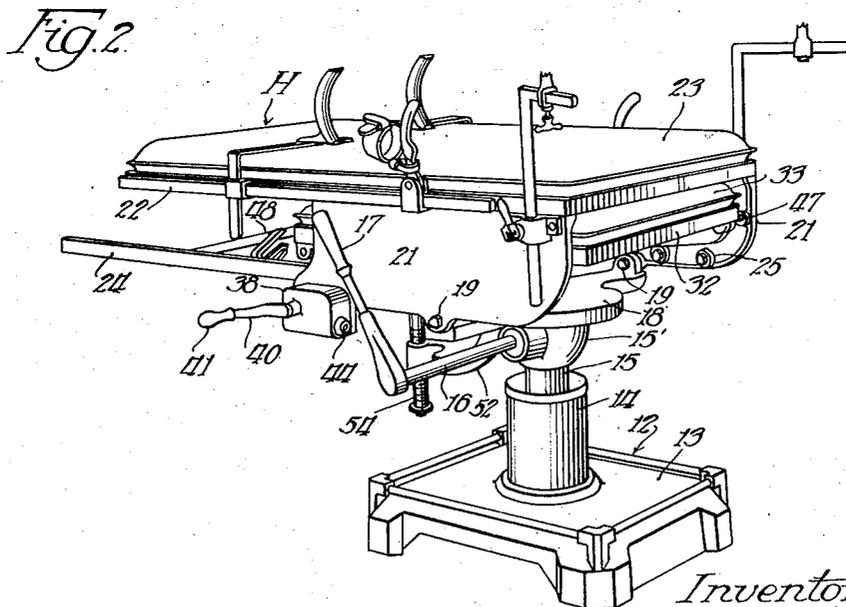
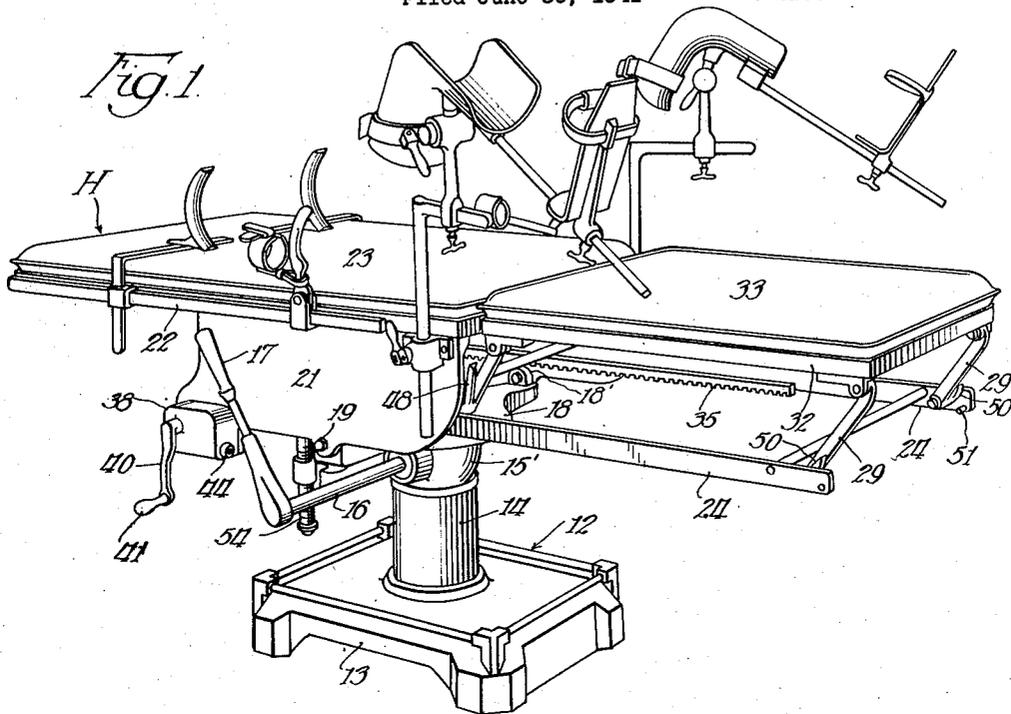
W. E. ANDERSON ET AL

2,306,031

OBSTETRICAL AND DELIVERY OPERATING TABLE

Filed June 30, 1941

5 Sheets-Sheet 1



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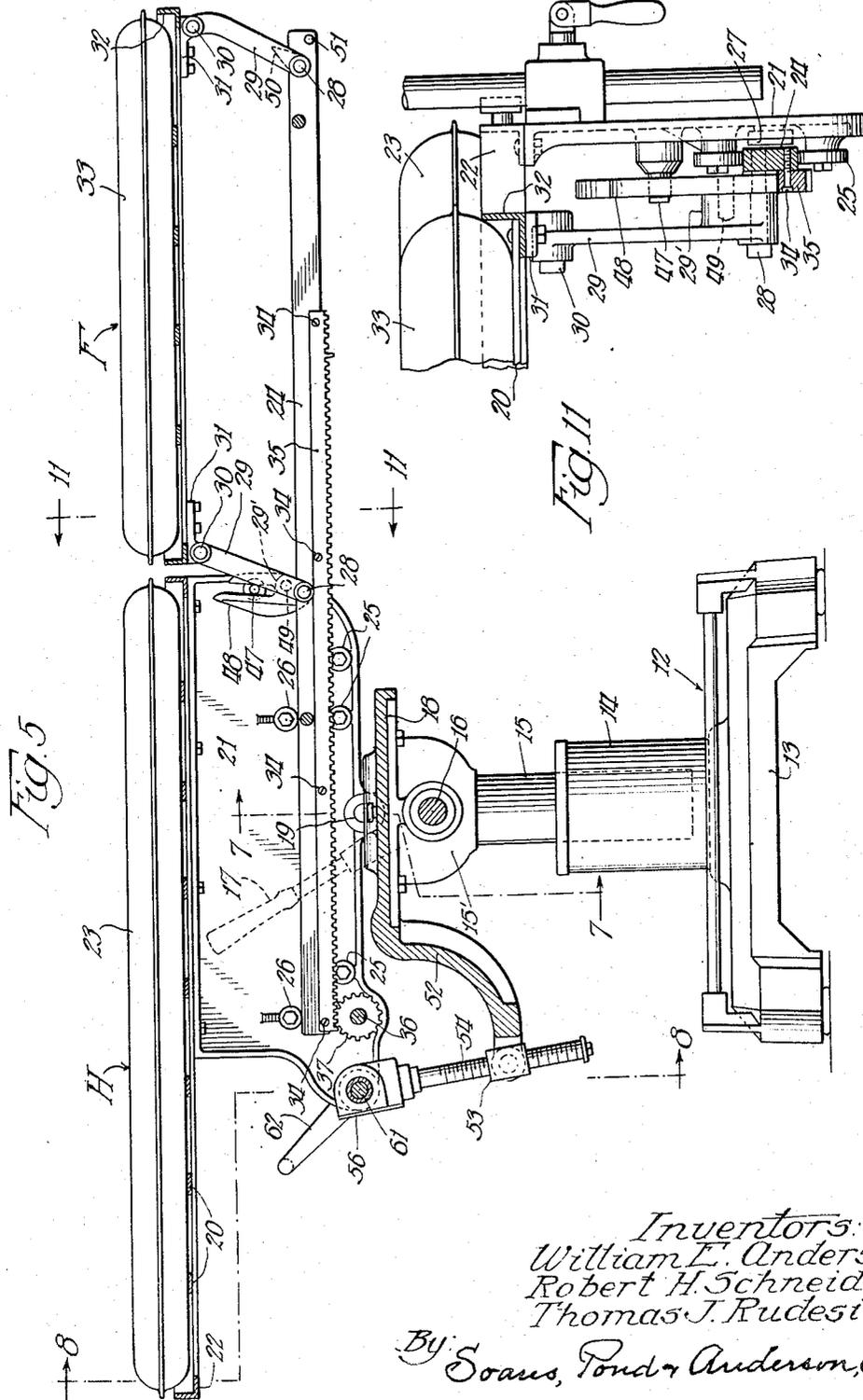
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OBSTETRICAL AND DELIVERY OPERATING TABLE

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5 Sheets-Sheet 3



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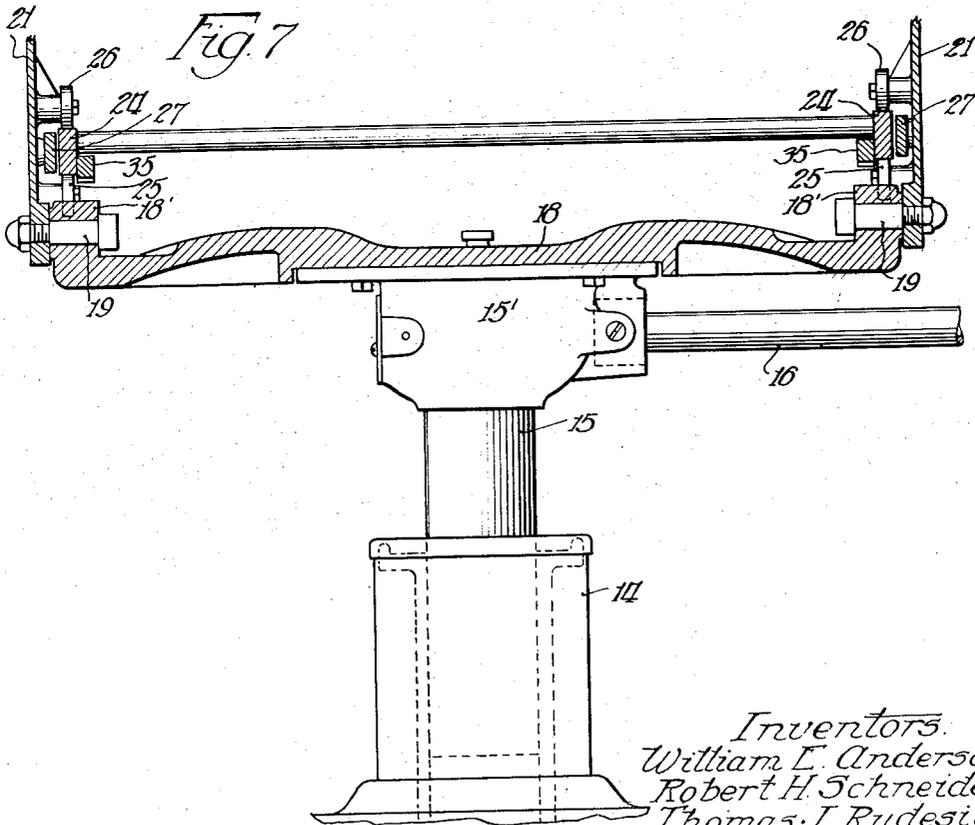
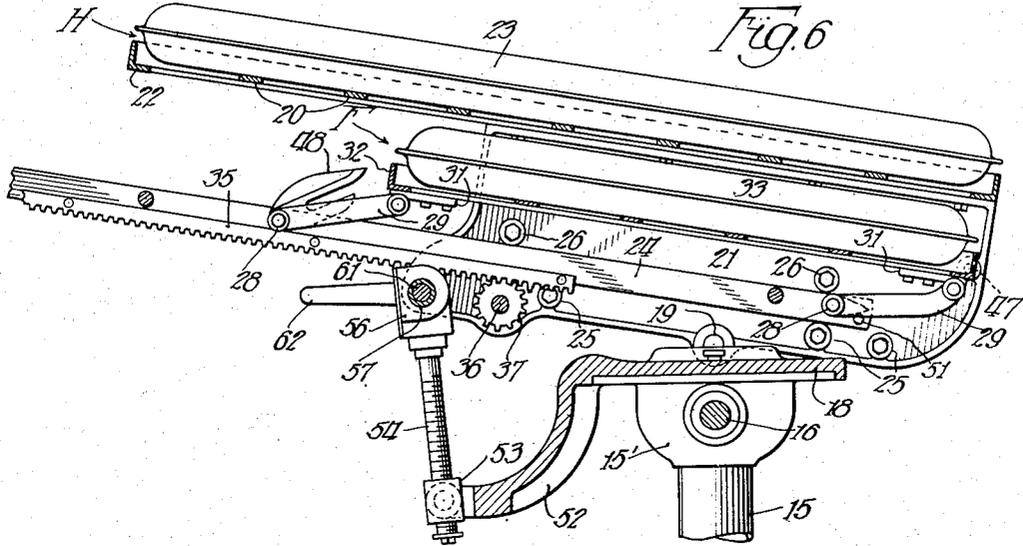
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OBSTETRICAL AND DELIVERY OPERATING TABLE

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5 Sheets-Sheet 4



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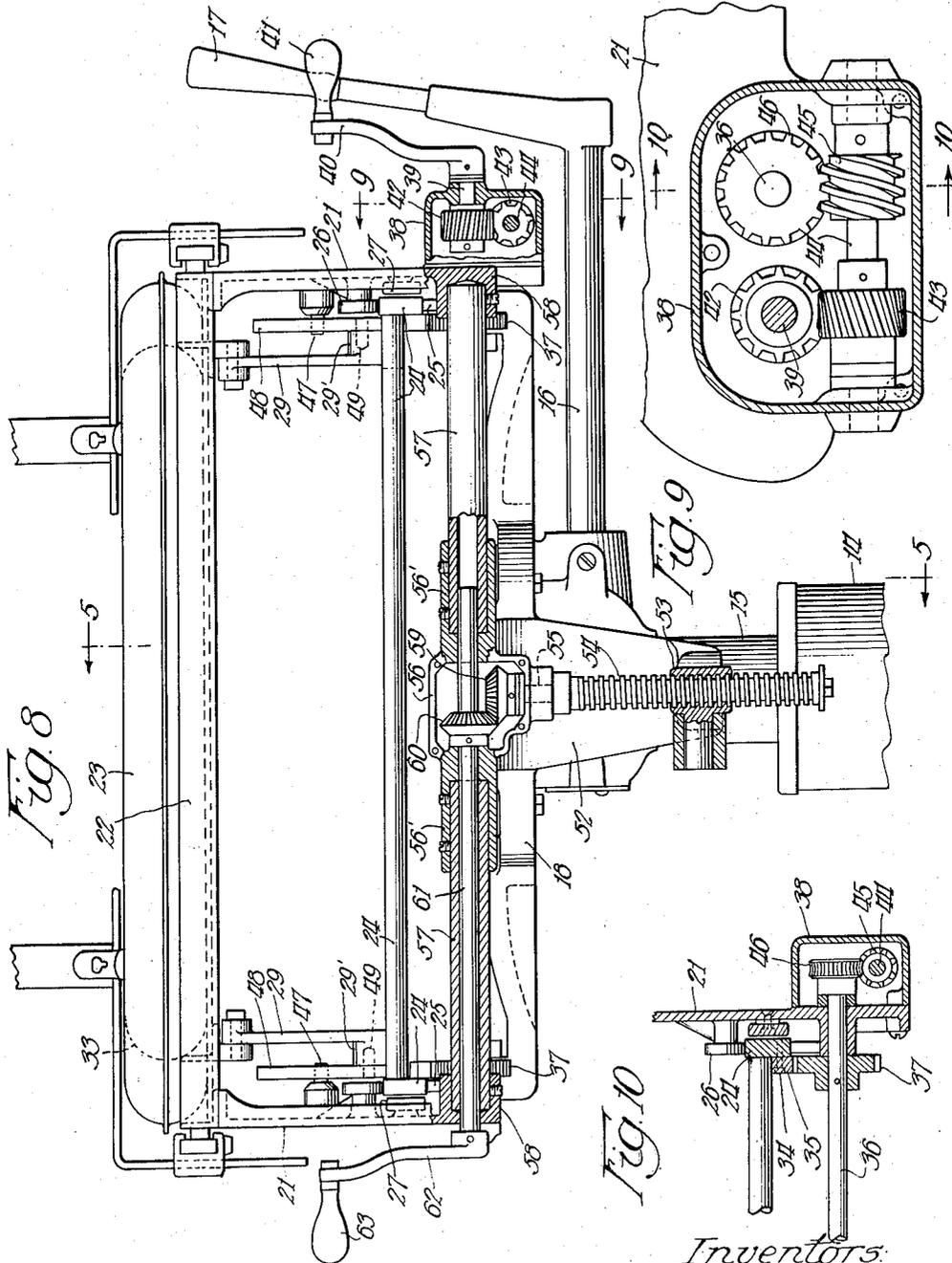
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OBSTETRICAL AND DELIVERY OPERATING TABLE

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5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

2,306,031

OBSTETRICAL AND DELIVERY OPERATING TABLE

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5 Claims. (Cl. 311-5)

This invention relates to obstetrical and delivery tables or beds such as are extensively used in the maternity wards of hospitals and like institutions to aid expectant mothers in giving birth to their infants.

In a known type of such tables, the table is made in two endwise aligned sections known as a head section which supports the portion of the body between the head and the buttocks, and a foot section which supports the legs of the patient prior to the time of delivery. When the time of delivery arrives, the legs of the patient are transferred to adjustable supports carried by the head section known as knee crutch and foot support assemblies, the foot section is lowered, and the head section is then moved forwardly over the lowered foot section to enable the physician to operate from a position directly in front of the head section rather than from the side of the table. This arrangement requires the movement of the patient from reclining to delivery position when delivery begins, and, in cases where an anesthetic is administered, it requires the anesthetist to follow the patient, and where the supporting frame of the table includes side frames of approximately the combined length of the head and foot sections, it necessitates the omission of all cross-members between the rear portions of the side frames to enable the anesthetist or other nurse to follow the patient from reclining to operating position.

Still other objects and advantages of the invention will be apparent to obstetricians and others skilled in the art from the following detailed description, taken in connection with the accompanying drawings, in which we have illustrated a practical and approved embodiment of the invention, and wherein—

Figs. 1, 2, 3 and 4 are all perspective views of the complete table, Fig. 1 showing the table in full length horizontal reclining position; Fig. 2 showing it in shortened or collapsed horizontal position; Fig. 3 showing it in Trendelenburg or shock position; and Fig. 4 showing it in reverse Trendelenburg or drainage position.

Fig. 5 is a vertical longitudinal section taken on line 5-5 of Fig. 8 of the table in full horizontal position.

Fig. 6 is a vertical longitudinal section taken on line 6-6 of Fig. 4.

Fig. 7 is a vertical transverse section taken on the offset line 7-7 of Fig. 5.

Fig. 8 is an end elevation viewed on the line 8-8 of Fig. 5, with parts in section.

Fig. 9 is a detailed section through a gear box, taken on line 9-9 of Fig. 8.

Fig. 10 is a detail section through the gear box in a plane at right angles to that of Fig. 9, taken on line 10-10 of Fig. 9.

Fig. 11 is an enlarged fragmentary vertical section taken on line 11-11 of Fig. 5.

Referring to the drawings, 12 designates as an entirety a single pedestal that constitutes the sole support of the table and its mechanism, and is located substantially centrally both lengthwise and widthwise of the table. This pedestal preferably comprises a rectangular base member 13 and a central upstanding cylindrical member 14 that incorporates a well-known form of hydraulic jack. Similar jacks have been used for many years on barbers' and dentists' chairs for adjusting the height of the chair. The structural details are not herein illustrated because they have long been well known and constitute no part of the present invention, but within the cylinder 14 is a fixed pump cylinder, slidable within which is a hollow piston 15. To raise the piston 15 and the load carried thereby a plunger is slidable within the piston 15 and is moved up and down by a crank arm on a shaft 16, which shaft, in the present instance, is manually operated by a swinging handle 17 fast on the outer end of the shaft. On each complete down stroke of the handle 17 oil is forced into the bottom of the pump cylinder and this imparts a lift to the piston 15, there being within the piston a friction lock that grips the cylinder wall and holds the piston immovable at each down stroke of the handle 17, so that the piston is gradually raised by short step-by-step movements. The piston is lowered by an excess down movement of the handle 17 which releases the lock and allows the oil to flow back into the upper portion of the hollow piston. Some of these lifts are foot-operated by a pedal, which replaces the handle 17.

Mounted on the top end of the upper enlarged portion 15' of the piston 15 is a transverse yoke 18, which appears in vertical longitudinal section in Fig. 7. The ends of this yoke have up-turned extensions 18' in which are mounted horizontal pivot pins 19. H designates as an entirety the head section of the table or bed, which head section is equipped on its longitudinal sides with rigid depending side plates 21 that are mounted on the pivot pins 19. The rectangular head section H includes a bottom comprising a rectangular angle iron frame 22 equipped with cross slats 20, and a mattress 23.

Referring to Figs. 5 and 7, on the inner sides

of the side plates 21 are longitudinal slideways for the longitudinal limbs of a reciprocating straight rectangular frame 24 of greater length than the head section H, these slideways preferably consisting of a lower row of anti-friction rollers 25 and an upper row of similar anti-friction rollers 26, the frame bars 24 lying between and riding on the lower and upper rollers. This rectangular frame is of less width than the distance between the side plates 21, so that the frame can readily travel between said side plates; and to limit side movement of the frame so that it will not be disengaged from its supporting and guiding rollers 25 and 26, guide bars 27 (Fig. 7) are mounted on the side plates between the upper and lower rollers, in close proximity to the longitudinal side bars of the frame 24.

Pivotaly mounted at 28 on the forward portions of each side bar of frame 24 are a pair of parallel inclined links 29 that at their upper ends are pivoted at 30 to brackets 31 that are secured to the rectangular angle iron frame 32 of the foot section F of the table, this foot section also being supplied with a mattress 33 similar to, but somewhat shorter and narrower than, the mattress 23 of the head section H. The width of this foot section F is likewise less than the distance between the side plates 21 of the head section H, so that the foot section, when lowered and not in use, can readily be stored out of the way beneath the head section, as is illustrated in Fig. 6.

This foot section F is raised, lowered, and shifted inwardly and outwardly of the head section H by a simple manually operated means, as follows: Attached as by screws 34 to the inner sides of the side bars of frame 24 are rack bars 35, the teeth of which project below the lower edges of the said side bars, as best shown in Figs. 5, 7 and 11. Extending between and journaled in the lower rear corner portions of the side plates 21 is a cross-shaft 36 (Figs. 6, 5, 9 and 10), fast on which are pinions 37 meshing with the rack bars 35. The shaft 36 is preferably manually rotated in both directions through a self-locking gearing, the details of which are most clearly shown in Figs. 8, 9 and 10. Secured to the outer side of one of the side plates 21 is a gear box 38, in the outer face wall of which is journaled a short crank shaft 39 equipped with a crank arm 40 and handle 41. Fast on shaft 39 is a spiral gear 42 that meshes with and drives a mating spiral gear 43 fast on a shaft 44 journaled lengthwise of the box 38; and fast on shaft 44 is a second spiral gear 45 meshing with and driving a mating spiral gear 46 fast on the shaft 36. By turning the crank 40 in one direction, the rectangular frame and foot section carried thereby are moved outwardly and then upwardly relatively to the head section. By turning the crank 40 in the reverse direction, the foot section, which is gravity biased to lowered position, is allowed to drop and then retracted to beneath the head section. In both extreme positions and in any intermediate position the operating gearing last described locks the sliding frame against accidental movement in either direction.

By reason of the inclined position of the links 29 which support the foot section F when in its elevated position shown in Figs. 1 and 5, the foot section tends, as above stated, to drop by gravity. The lowered foot section is automatically raised to elevated position flush with the head section and held in said position by the following described mechanism: On the inner sides of the

front portions of the side plates 21 are inwardly projecting roller-equipped studs 47 (Figs. 5, 6, and 11), and these studs lie in the paths of travel of a pair of U-shaped hooks 48 that, as best shown in Figs. 5, 8 and 11, are rigidly secured to but spaced outwardly of the inner pair of links 29. At their lower ends the hooks 48 are mounted on the pivot pins 28, and above the latter they are secured to hubs 29' of the links 29 by locking screws 49. Thus the hooks are rigid with and partake of the swinging movement of the rear links 29. As the lowered foot section is moved outwardly from under the head section, the hooks 48, which are then lying in the position shown in Figs. 4 and 6, during the final part of the outward movement engage with the studs 47, and pull the links 29 upwardly to the position shown in Figs. 1 and 5, thus raising the foot section flush with the head section and holding it secure in said raised position, since the gearing which operates the frame 24 is self-locking. As soon as said gearing is operated to lower and retract the foot section, the hooks 48 swing downwardly with the links 29 and are withdrawn from engagement with the studs 47. These movements of the foot section can be effected in any of the positions of the table illustrated in Figs. 1, 2, 3 and 4; and the same operating gearing will lock the foot section whether it is fully or partly retracted beneath the head section; the partly retracted position being occasionally employed to insure the safety against accidental falling to the floor of the newly born infant, as well as for other purposes. The down movement of the foot section is limited by means of a lug 50 (Figs. 1 and 5) fast on the outer side of each forward link 29 and a stop pin 51 projecting inwardly from the forward end of each side bar of frame 24.

In order that the table may be readily adjusted to all of the positions employed in practice, a simple, manually operated self-locking mechanism is provided for tilting it between the several positions and securely holding it in any selected position. This tilting mechanism is best illustrated in Figs. 5, 6, and 8. Integral with the rear edge of the yoke 18 is a rearwardly and downwardly extending bracket arm 52, in the free end of which is a horizontally pivoted nut 53. Extending through and engaged with nut 53 is a threaded rod 54, the upper portion of which is journaled at 55 (Fig. 8) in the lower portion of a gear box 56, which gear box is formed with sleeve extensions 56' swiveled on the inner ends of a pair of tubes 57, said tubes 57 being turnably mounted at their outer ends in bosses 58 on the lower rear corners of the side plates 21. Fast on the upper end of the threaded rod 54 is a miter gear 59 that meshes with and is driven by a miter gear 60 fast on a shaft 61 that extends through one of the tubes 57, and the gear box 56, and enters the inner end of the other tube 57. Fast on the outer end of shaft 61 is a crank arm 62 and handle 63.

By turning the crank arm 62 in one direction or the other, the entire table, whether in full length, or shortened, or an intermediate position, can be readily tilted between all of the horizontal and inclined positions illustrated, and when so tilted, is securely locked in tilted position, since the operating gearing is self-locking against accidental movement.

In Figs. 1, 2, 3 and 4, we have shown the table equipped with the usual adjustable accessories for bracing the shoulders and supporting the legs and feet of the patient during labor, but

since these accessories form no part of the present invention, description thereof is unnecessary.

From the foregoing description it will be readily understood how the stated purposes and objects of the invention are accomplished. As the time for labor approaches, the patient is placed on the fully extended table shown in Figs. 1 and 5 where she reclines at full length with her legs and feet resting on the foot section F. At the inception of delivery, the patient's legs and feet are transferred to the knee-crutch and foot supports, and the crank 40 is then turned in a direction to lower and retract the foot section F beneath the head section H, as is illustrated in Fig. 2. Should the patient show signs of fainting, by turning the crank 62 the table may be instantly tilted to the Trendelenburg or shock position illustrated in Fig. 3, and for drainage purposes, the turning of the crank 62 in the reverse direction places the table in the reverse Trendelenburg or drain position shown in Figs. 4 and 6. In all positions, the patient herself does not have to be moved and consequently the anesthetist, who usually stands behind the table and the head of the patient, does not have to move while attending the patient. The retraction of the foot section wholly out of the way beneath the head section leaves ample room for the physician to operate at the front, the single centrally located pedestal support also presenting no obstruction to the ready and easy access of the physician to the work at hand. The table can be bodily raised or lowered to a convenient height by manipulating the hydraulic lift, and it can also be swung horizontally to obtain the best light, and is self-locked in any adjusted position. So far as we are aware, we are the first, in the present invention, to combine all of these advantages in a single operating table of the character described.

Variations and modifications in the details of structure and arrangement of the parts may be resorted to within the scope and coverage of the appended claims.

We claim:

1. In an obstetrical table of the class described, the combination of a support, an endwise immovable head section having depending side plates mounted on said support, said side plates having longitudinal slideways on their inner sides, a straight rectangular frame of greater length than said head section mounted to move endwise in said slideways and carrying rack bars, a foot section, front and rear pairs of pivoted inclined links mounting said foot section on said frame under a gravity bias of said foot section to swing downwardly to a level below that of said head section, a cross shaft journaled in said side plates carrying pinions engaged with said rack bars, manually operable self-locking gearing for rotating said cross shaft in both directions, and co-operating members on said head section and rear links respectively, operative to raise said foot section flush with said head section during the final part of the outward movement of said frame and foot section.

2. An embodiment of claim 1, wherein the co-operating members for raising the foot section

comprise inwardly projecting fixed studs on the respective inner sides of said side plates and U-shaped hooks respectively rigid with the rear mounting links of the foot section, said studs intersecting the paths of travel of said hooks and entering the latter to swing said hooks, links and foot section upwardly immediately after the foot section has emerged from beneath the head section.

3. An embodiment of claim 1, wherein the support comprises a single pedestal having a vertically movable piston and a transverse yoke mounted on the top of said piston, and the side plates of the head section are pivoted on the ends of said yoke.

4. In an obstetrical table of the class described, the combination of a support, an endwise immovable head section having depending side plates mounted on said support, said side plates having longitudinal slideways on their inner sides, a straight rectangular frame including side bars of greater length than said head section mounted to move endwise in said slideways, rack bars secured to the inner sides of said frame side bars with their teeth lying below the lower edges of said side bars, a foot section, front and rear pairs of upwardly and forwardly inclined links pivoted at their lower ends on said frame side bars and at their upper ends on the corner portions of said foot section, the inclination of said links creating a gravity bias of said foot section to swing downwardly to a level below that of said head section, a cross shaft journaled in said side plates carrying pinions engaged with said rack bars, manually operable self-locking gearing connected to one end of said cross shaft adapted to rotate the latter in both directions, and inter-engaging members on said side plates and rear links respectively, operative to raise said foot section flush with said head section during the final part of the outward movement of said frame and foot section and to control the lowering movement of said foot section during the first part of the inward movement of said frame.

5. In an obstetrical table of the class described, the combination of a support, an endwise immovable head section mounted on said support, a rectangular frame mounted on said support for reciprocal endwise movement between extended and retracted positions, a foot section, link mechanism supporting said foot section on said frame to permit a vertical shifting of said foot section to occupy positions either flush with or in a plane below said head section, manually controlled interlocking gear mechanism on said support and frame operatable to shift said frame endwise of said support and to lock said frame relative to said support to any position intermediate said extended and retractable positions, and co-acting means on said support and link mechanism for automatically effecting the lowering and elevating of said foot section on said frame during the initial inward and the final outward movements, respectively, of said frame relative to said support.

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CERTIFICATE OF CORRECTION.

Patent No. 2,306,031.

December 22, 1942.

WILLIAM E. ANDERSON, ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, first column, line 31, after the word and period "position." insert the following paragraphs -

--In a later type of such tables the head section is stationary as regards endwise movement, and the foot section is shiftable between a raised position in which it is aligned with and forms in effect an extension of the head section and a lowered position in which it wholly underlies the head section and is entirely out of the way of persons in attendance on the patient. This later type has advantages over the earlier type, in that the patient does not have to be moved from reclining to delivery position, and the anesthetist or nurse that administers to the needs of the patient from behind the head section does not have to follow the latter as it moves over the lowered foot section.

Our present invention relates to the last named type of table, and the primary objects are to provide improved fully automatic means for raising and lowering the foot section operated by the same mechanism that moves the foot section in and out relatively to the head section; to provide automatic means for raising and lowering the foot section that will hold the latter in either fully raised or partly raised position; and to provide a manually operated mechanism for moving the foot section in and out relatively to the head section that shall be self-locking in all positions to which the foot section is moved; and generally, to produce a new, simplified, and improved equipment which provides new conveniences for delivery procedures, post-delivery repair, and all kinds of gynecic operations. --

and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 9th day of February, A. D. 1943.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.