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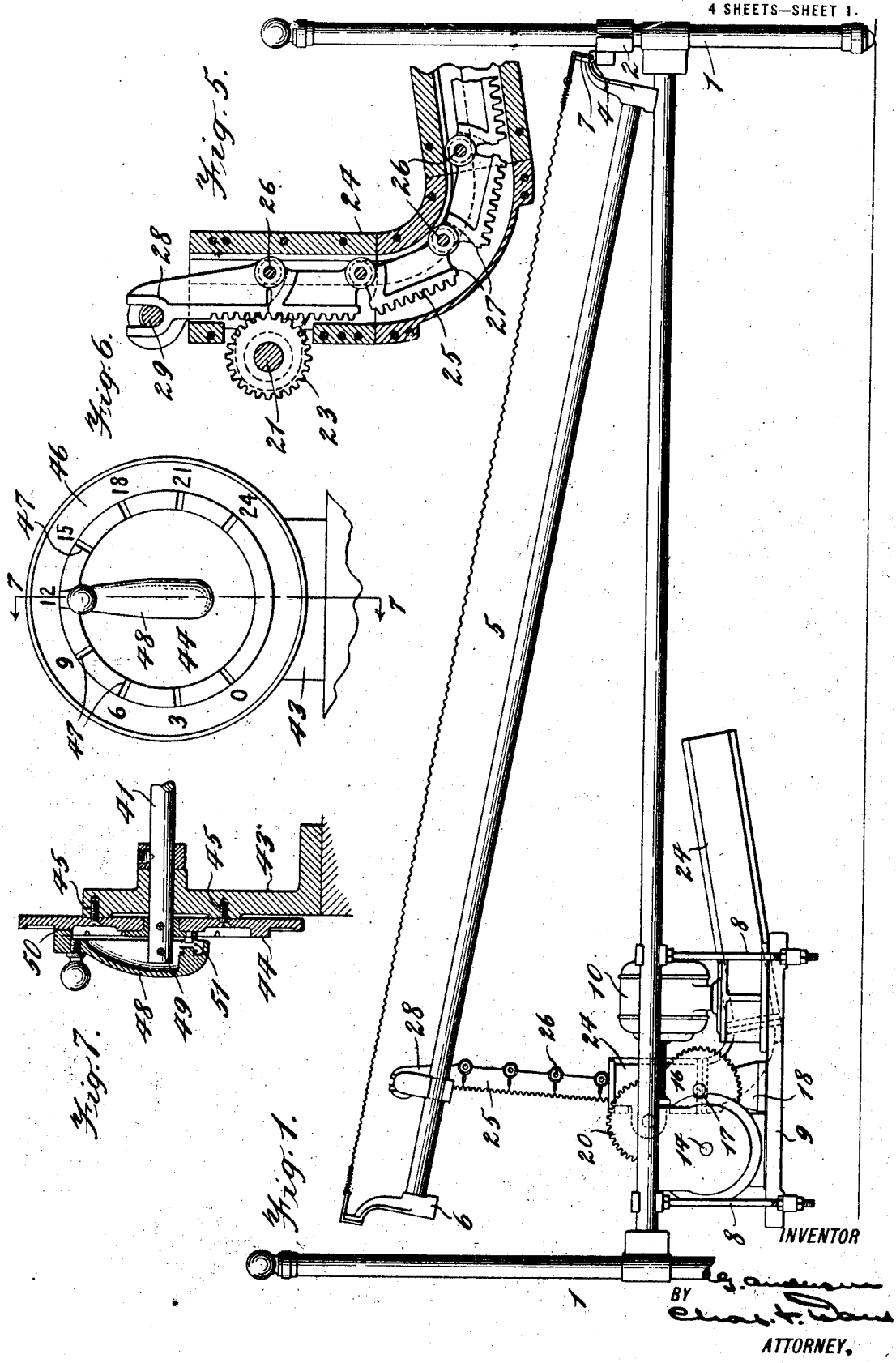
TILTING BED.

APPLICATION FILED DEC. 13, 1917.

1,328,802.

Patented Jan. 27, 1920.

4 SHEETS—SHEET 1.



G. ANDERSON.

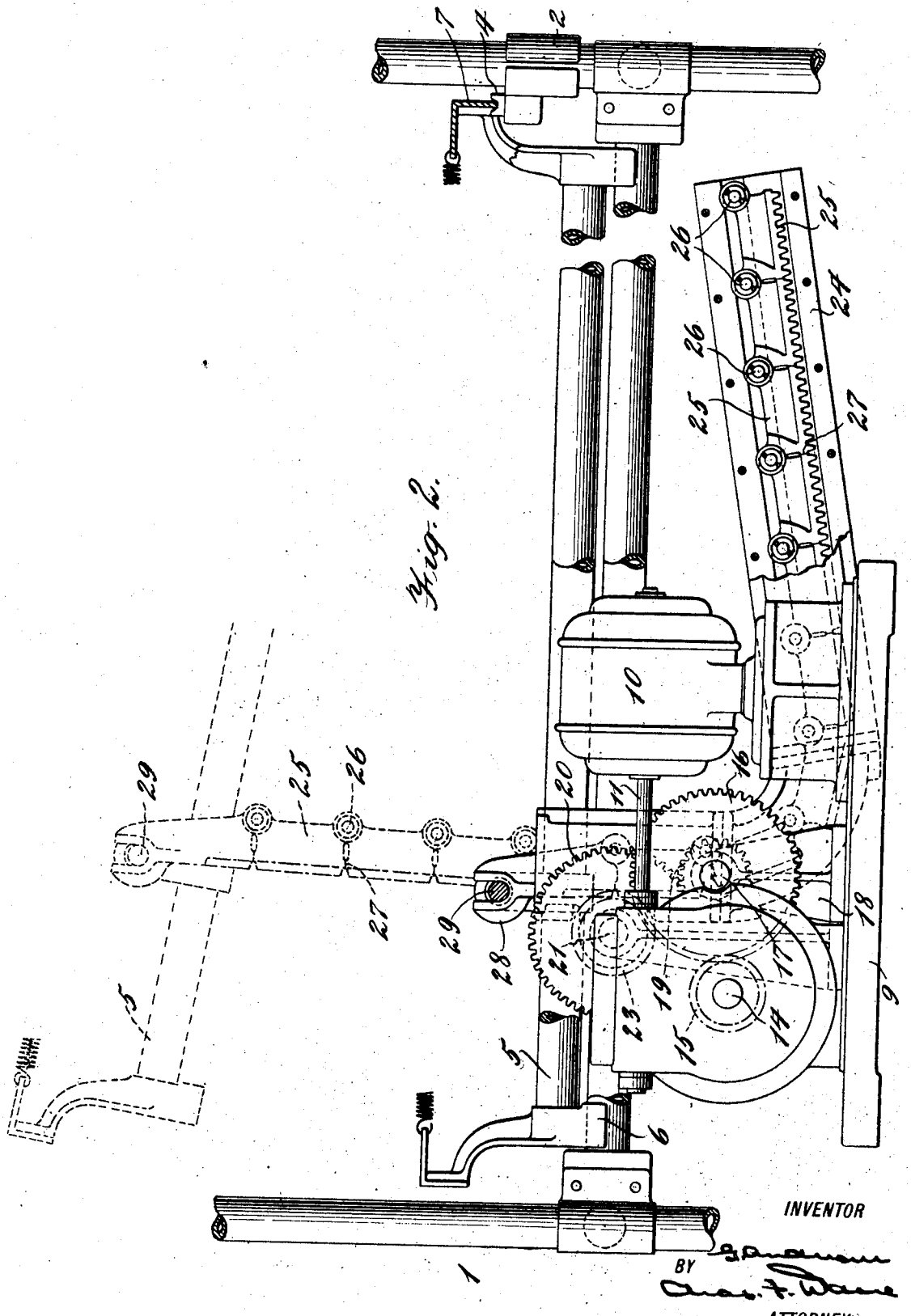
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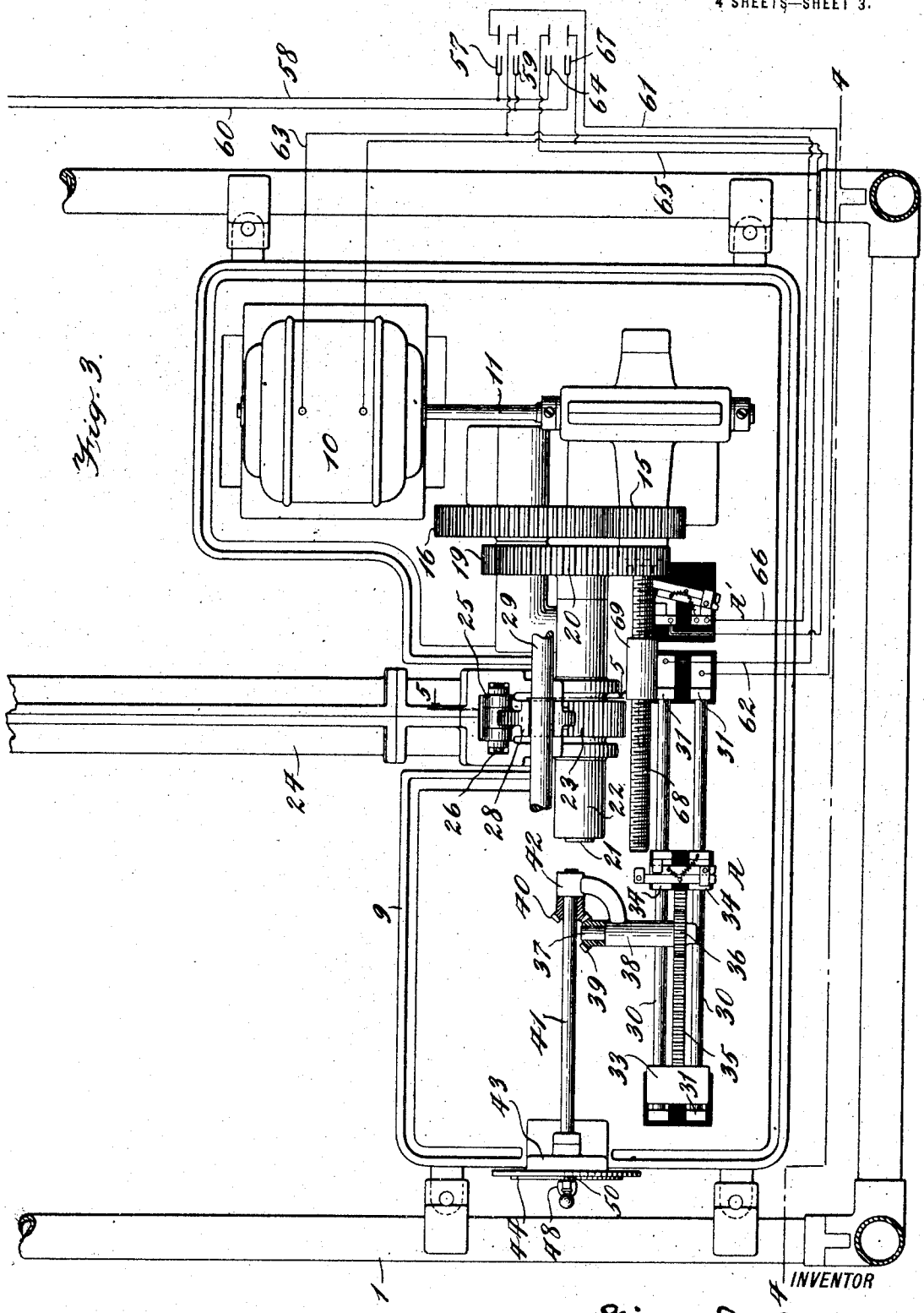


Fig. 3.

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4 SHEETS—SHEET 4.

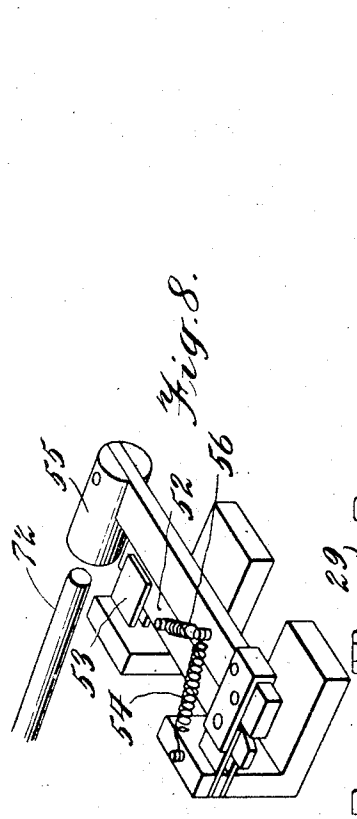


Fig. 8.

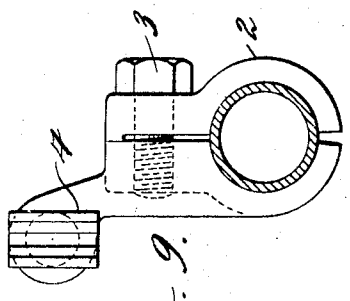


Fig. 9.

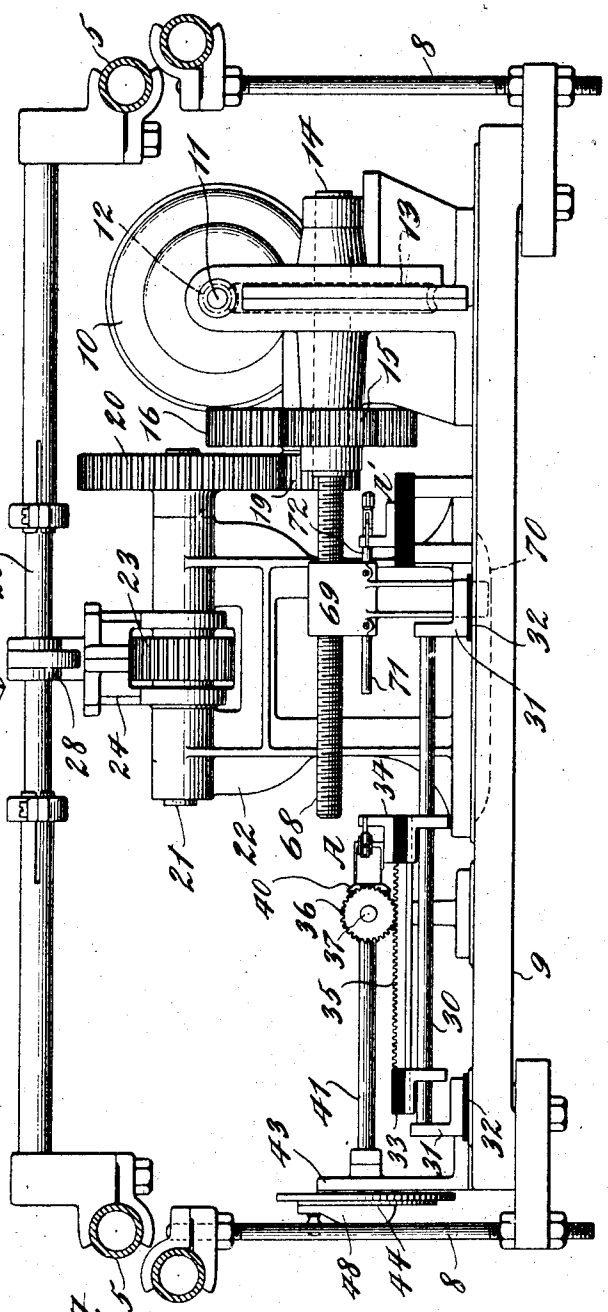


Fig. 4.

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TILTING BED.

1,328,802. Specification of Letters Patent. Patented Jan. 27, 1920.

Application filed December 13, 1917. Serial No. 206,899.

To all whom it may concern:

Be it known that I, GIDEON ANDERSON, a subject of the King of Sweden, and resident of the city of New York, in the county of Bronx and State of New York, have invented certain new and useful Improvements in Tilting Beds, of which the following is a specification.

This invention relates to tilting beds and has particular reference to the mechanism for varying the inclination of the bed whereby the vascular system of a patient may be controlled and exercised within limits for curative or health purposes.

The invention has for its main object the provision of a mechanism of this character that will be capable of being set by an attendant for effecting a raising and lowering of the bed within certain predetermined limits, and that may subsequently be operated by the patient to raise and lower the bed within those limits through the medium of a simple electrical control.

With these and other objects in view, such as will appear as the description progresses, the invention comprises the combination and arrangement of parts as set forth in, and falling within the scope of, the appended claims.

In the drawings:

Figure 1 is an elevational view of a bed with the raising and lowering mechanism in place thereon and showing the spring frame in a raised or inclined position.

Fig. 2 is a similar view, but on an enlarged scale and with certain of the parts broken away for the clearer illustration of other parts. In this view the spring frame is shown in lowered position in full lines and in raised position in dotted lines.

Fig. 3 is a plan view of a portion of the mechanism with the control circuits illustrated diagrammatically.

Fig. 4 is a transverse sectional view through the bed and spring frame, taken on the line 4—4 of Fig. 3, illustrating the connection of the mechanism with the bed and spring frame.

Fig. 5 is a fragmental sectional view of the flexible rack, illustrating the pinion for operating the same and the manner in which it engages the spring frame, the section being taken on line 5—5 of Fig. 3.

Fig. 6 is an elevation of the setting dial.

Fig. 7 is a vertical sectional view of the same, taken on line 7—7 of Fig. 6.

Fig. 8 is a perspective view of one of the circuit breaking switches, and

Fig. 9 is a plan view of one of the spring frame supporting elements.

Referring to the drawings, wherein there is illustrated a constructional form of my invention, the usual form of bed frame 1 is disclosed, on the vertical head posts of which clamps 2 are secured by means of fasteners 3. These clamps are capable of pivotal movement about the head posts, and carry pivot blocks 4, which are adapted to move about vertical pivots parallel to the pivots of the clamps 2. The clamps may thus be moved about the bed posts as pivots and will in turn move the pivot blocks 4, so as to allow for any variation in the length of the spring frames. The spring frame illustrated in the drawing at 5, is provided at the foot end of the bed with socket members 6 of usual form, which rest upon the side rails of the bed frame. At the opposite or head end of the bed the spring frame is provided with a bearing member or bar 7, which rests within V-shaped seats in the pivot blocks 4. With this construction, the foot of the spring frame is capable of being raised, while the bar 7 rests within the pivot blocks 4, and thus the angular position of the spring frame may be varied to suit the needs of the particular patient.

Depending from the side bars of the bed frame are supporting rods 8, which carry at their lower ends a base 9, located in position beneath the bed. A motor 10 is mounted on this base 9, and the motor shaft 11 is extended and provided with a worm 12, which meshes with a worm wheel 13. This worm wheel 13 is rigidly mounted on a shaft 14, which is carried in suitable bearings on the base 9, and is provided with a gear 15. This gear 15 meshes with a relatively larger gear 16, which is carried by an independent shaft 17, the latter shaft being mounted in bearings 18 on the base. A relatively smaller gear 19 is fixed to the shaft 17 and meshes with a large gear 20. This gear is fixed to a shaft 21, which is supported by bearings 22, and which carries a driving gear 23. Pivotally mounted on the shaft 21 is a casing 24, which depends from the shaft and is freely movable thereon. A flexible rack is slidably

mounted within this casing 24 and is adapted to move longitudinally thereof. This rack consists of a plurality of sections 25, which are pivoted together at 26 at one side of the rack, and which bear against each other at 27 at the opposite side of the rack. The uppermost of these sections is provided with a socket member 28 which receives a cross-bar 29. This cross-bar extends between the side bars of the bed spring 5, and is secured thereto by suitable clamps. In order that this cross-bar may be readily adaptable to beds of different widths, it is made extensible as shown in Fig. 4.

The driving gear 23, previously referred to, extends through an opening in one side of the casing 24 and meshes with the teeth of the flexible rack, so that upon the rotation of the driving gear, the rack will either be raised or lowered, depending, of course, upon the direction of rotation of the gear. With this described mechanism, it will be seen that upon the energizing of the motor, the driving gear 23 will be set in motion, and will in turn operate the rack so as to raise or lower the same, and will consequently either raise or lower the engaging end of the spring frame. Of course, the raising and lowering is entirely dependent upon the direction of rotation of the motor armature.

It should be observed that the point of support of the cross-bar 29 is directly over the points of contact 27 of the rack sections when the sections are arranged in a substantially vertical position, and that the pivot points of the rack sections are to one side of the vertical line passing through the points 27, so that the collapsing of the sections, while they are extended from the casing 24, will be impossible.

A pair of parallel horizontally arranged bars 30 are supported by brackets 31 on the base 9, said brackets being suitably insulated from the base, as illustrated at 32. A pair of slides 33 and 34 are mounted on these bars 30, and extending between the same is a rack 35, which is insulated from the slides. A relatively small gear 36 is secured to a shaft 37 and meshes with the rack 35. This shaft is mounted in a suitable bearing 38, and is provided with a beveled pinion 39, which meshes with a similar pinion 40, which is carried by a shaft 41. One end of this shaft is supported by a bearing 42, and the opposite end by a bearing 43. This latter bearing 43 has a dial 44 rigidly secured thereto by fasteners 45. The dial is provided with a scale, such as illustrated at 46, which scale represents the inches which the spring frame is to be raised and beside each of the representations of the scale, is a notch 47. A handle 48 is secured at 49, to the shaft 41, so that its movement will cause the rotation of the shaft. The handle is, however, free to move on an axis at right angles to the axis of the shaft and independently of the latter, whereby a suitable projection 50 on the handle may be made to engage in one of the notches 47. This projection is retained in its engaging positions by a spring 51, so that the accidental movement of the handle after having been set, will be prevented.

It will be obvious that upon the rotation of the shaft 41 the slides 33 and 34 will be moved longitudinally on the bars 30. The slide 34 carries a circuit breaking switch A, such as illustrated in detail in Fig. 8. This switch includes a pivoted blade 52, which is normally held in engagement with a socket 53, by a spring 54 and carries at its free end a knob 55 of insulating material. It will be noted that the switch described is of the quick acting type, where the withdrawal of the blade from the socket 53 is accomplished by a spring 56, after the latter has been put under tension in the manner which will subsequently be described. This switch is properly insulated from the supporting slide 34. A controlling switch, which may be in the form of a push button is located in such position that it will be within easy reach of the patient, and one terminal 57 is connected to one pole of a suitable source 58, while the opposite terminal is connected to the other pole 60 of the source. When the switch is closed, a circuit will be established from the source through the terminal 57, the conductor 61 to one of the supporting brackets 31, through the adjacent bar 30, through the switch blade 52 to the opposite bar 30, through the bar 30 and the adjacent bracket 31 to a conductor 62, through the conductor 62 to the motor 10, and through a conductor 63 through the terminal 59 of the controlling switch, back to the source. Thus when the switch blade 52 and the controlling switch are closed, the motor will actuate the train of gears above described, and raise the spring frame. In order that the spring frame may be lowered, a second switch A', similar to that illustrated in Fig. 8, is provided, and this switch is included in a circuit from the source, through one terminal of a controlling switch or push button 64, through a conductor 65, through the switch, through a conductor 66, through the motor 10 in the reverse direction, through the conductor 62 and the terminal 67 of the controlling switch, back to the source.

The end of the shaft 14, which is directly driven by the motor through the worm 11 and the intermeshing worm wheel 13, is extended and threaded at 68. This threaded end passes through and is in threaded engagement with a sliding block 69, which is guided by a channel 70 in the base 9 and carries a pair of projecting plungers 71 and 72, which are adapted to engage the respec-

tive circuit breaking switches to arrest the operation of the motor and consequently the upward or downward movement of the spring frame.

In operation, assuming for example, that it is desired to raise the spring frame at one end to the extent of twelve inches, the attendant rotates the shaft 41 by means of the handle 48 until the projection 50 on the handle engages the notch opposite the twelve inch indication on the dial 46. This rotation of the shaft advances the switch A toward the adjacent plunger 71 and brings it to a predetermined position relative thereto. When the motor is now energized, the block 69 will move toward the switch A until the plunger 71 engages the knob 55 and causes the breaking of the circuit by the disengagement of the switch blade 52. At this time the motor will be deënergized and the upward movement of the bed arrested. Of course, when it is desired to lower the spring frame the opposite push button is operated by the patient and the rotation of the motor armature in the opposite direction will cause a retrograde movement of the block 69. Retrograde movement will continue until the plunger 72 engages the knob of the circuit breaking switch A′, at which time the motor will again be deënergized and the spring frame will be in a horizontal or lowered position.

With this construction it will be seen that the attendant need only to first set the dial to the desired point, and the actual raising or lowering of the spring frame within the limits so set or determined may be subsequently brought about by the patient through a simple electrical control.

What I claim is:—

1. The combination with a pivoted bed spring frame, of means including a motor, for raising and lowering the same about its pivot, circuit breaking switches interpolated in the motor circuits, means advanced by the motor for selectively engaging said switches, and means for varying the positions of said switches with relation to the last mentioned means, whereby the period of energization of the motor may be varied.

2. The combination with a pivoted bed spring frame, of means for raising and lowering the same about its pivot, said means including a motor, an articulate rack and a gear actuated by the motor and meshing with the rack, circuit breaking switches interpolated in the motor circuits, means reciprocated by the motor for selectively engaging the switches, and means for adjusting the position of one of said switches with relation to the last mentioned means.

3. The combination with a pivoted bed spring frame, of means including a motor for raising and lowering the frame about its pivot, circuit breaking switches interpolated in the motor circuits, a screw-threaded shaft driven by the motor, a block mounted to be moved longitudinally on the shaft, a plunger carried by the block and adapted to engage and to open the switches, selectively, and means for adjusting the position of one of the switches with relation to the plungers.

4. The combination with a bed and a spring frame pivoted thereon, of means including a motor for raising and lowering the frame about its pivot, means advanced by the motor for selectively engaging the switches, and means for varying the position of one of the switches with relation to the last-mentioned means, said means including a handle mounted on the bed and within reach of the occupant thereof, and means connecting the handle to one of the switches.

Signed at New York, in the county of New York, and State of New York, this 8th day of December, A. D. 1917.

GIDEON ANDERSON.

Witnesses:

C. J. BUTLER,

CHAS. F. DANE.