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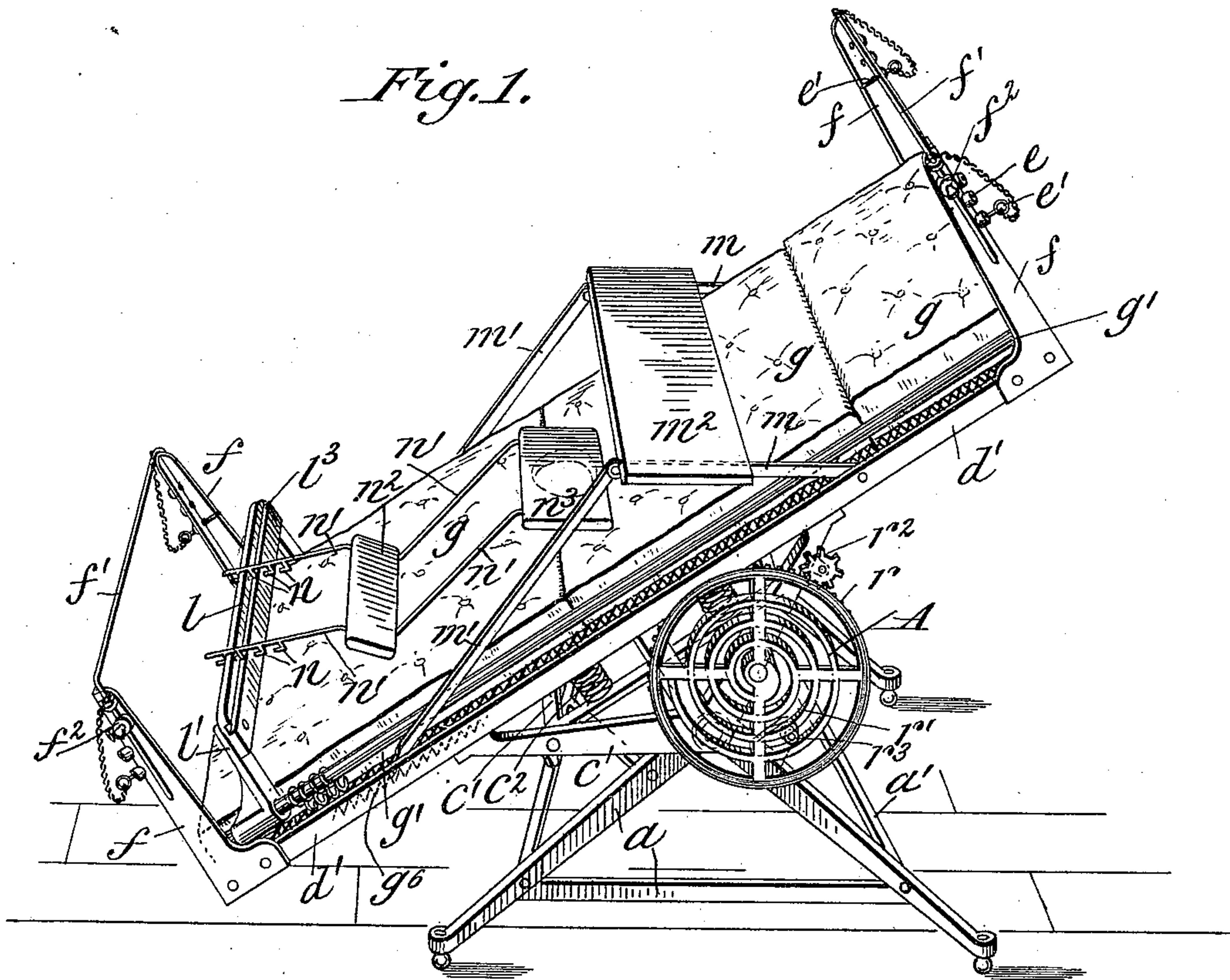
2 Sheets—Sheet 1.

G. E. GORHAM.  
INVALID BEDSTEAD.

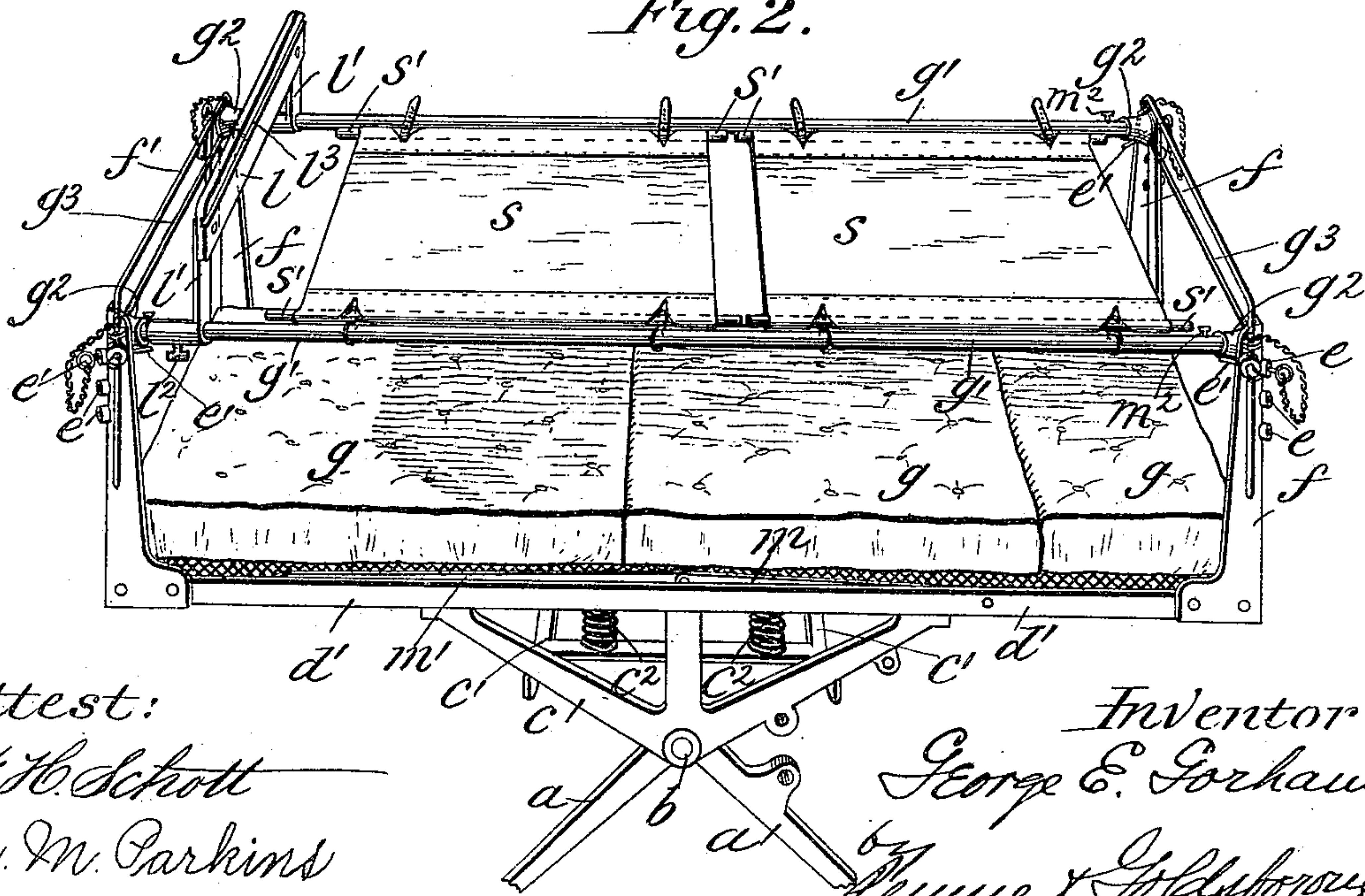
No. 525,952.

Patented Sept. 11, 1894.

*Fig. 1.*



*Fig. 2.*



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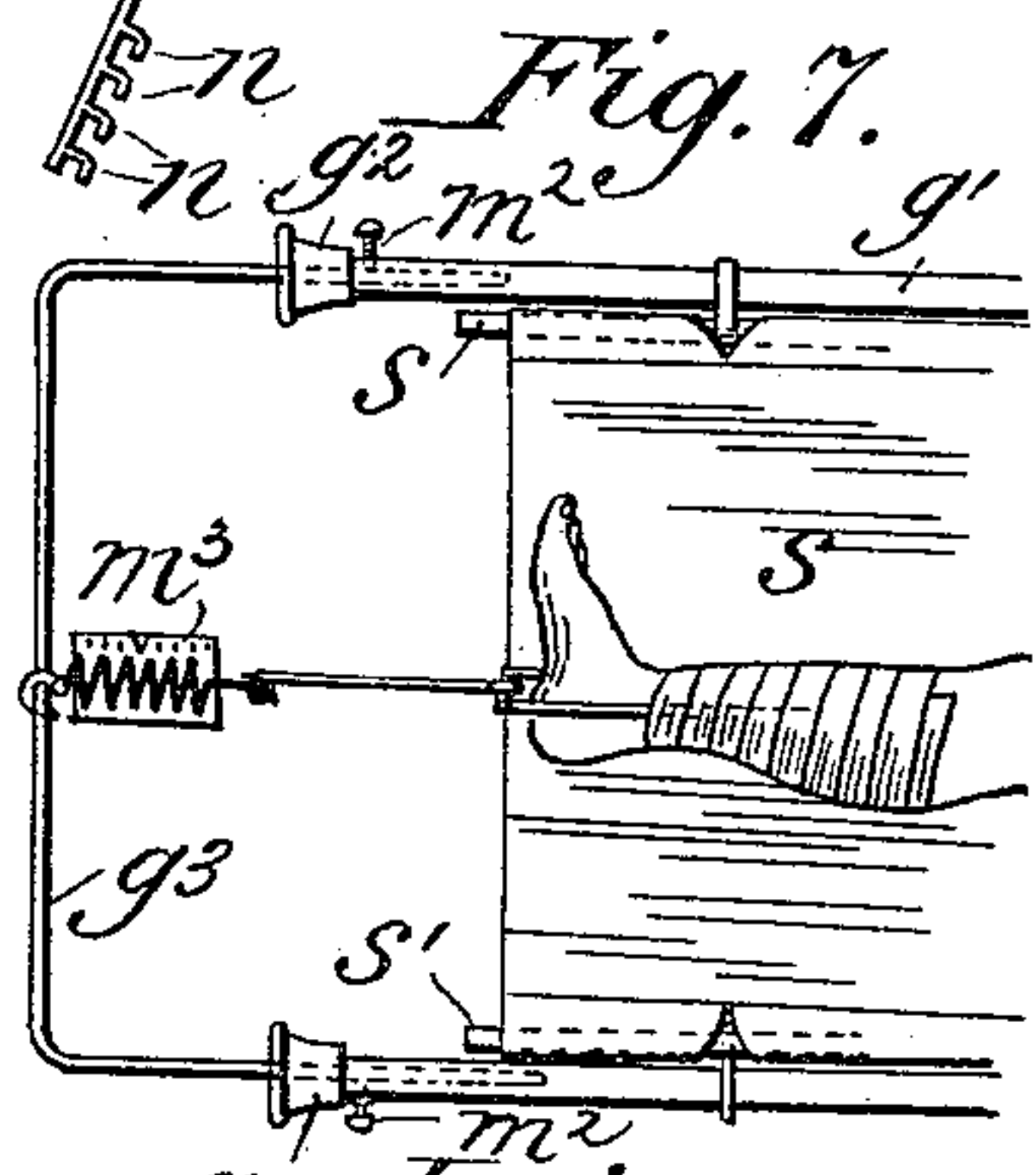
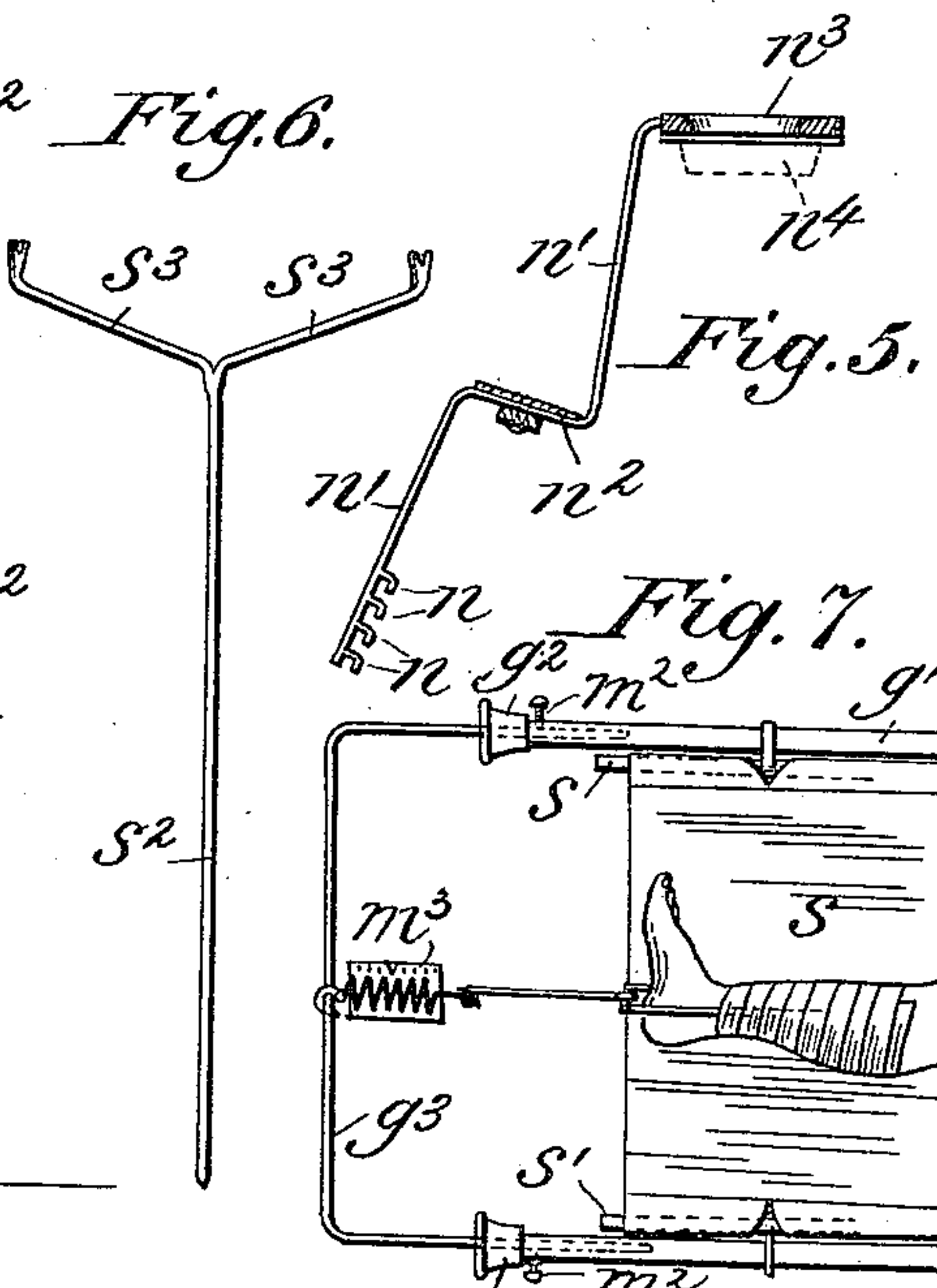
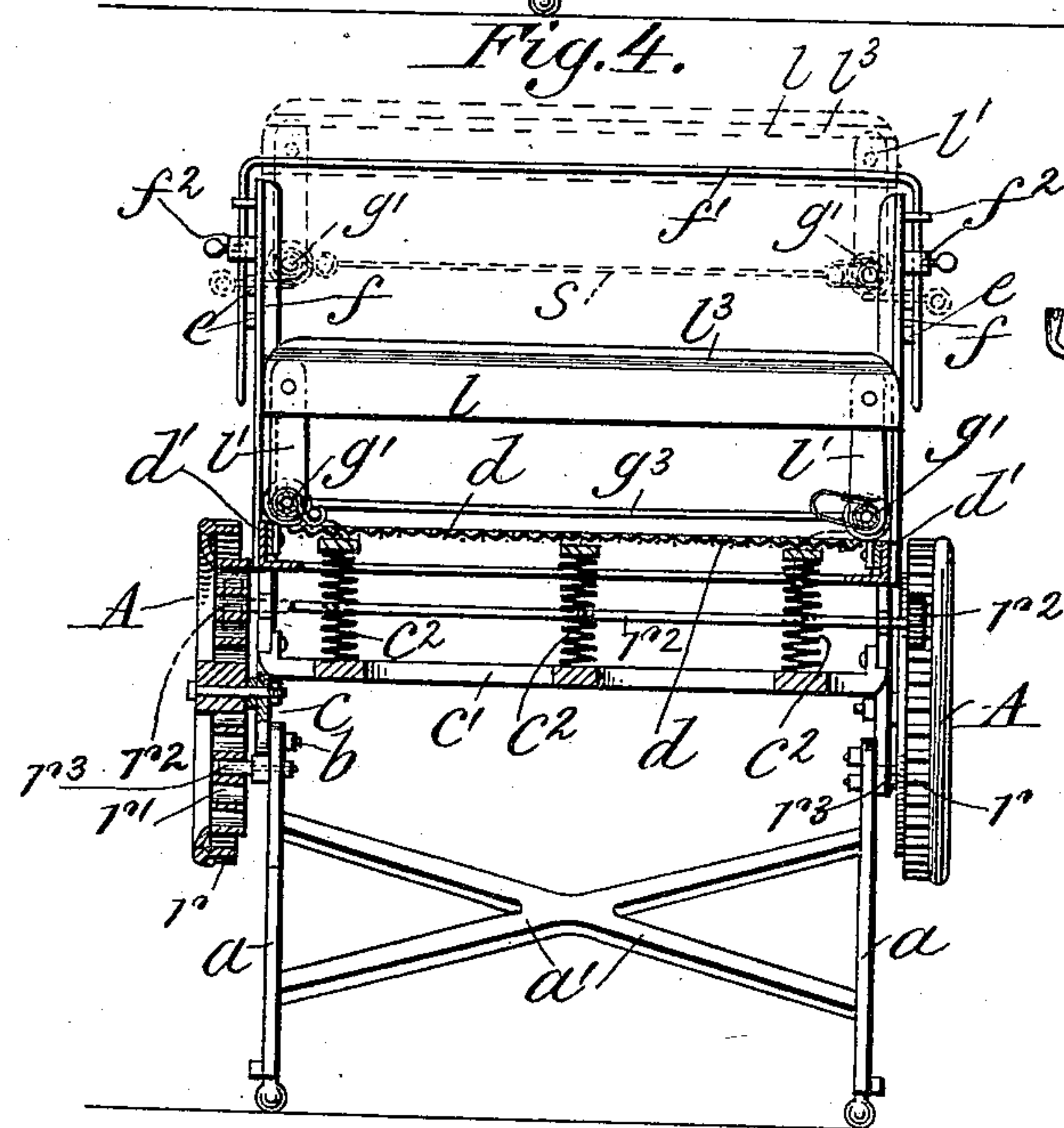
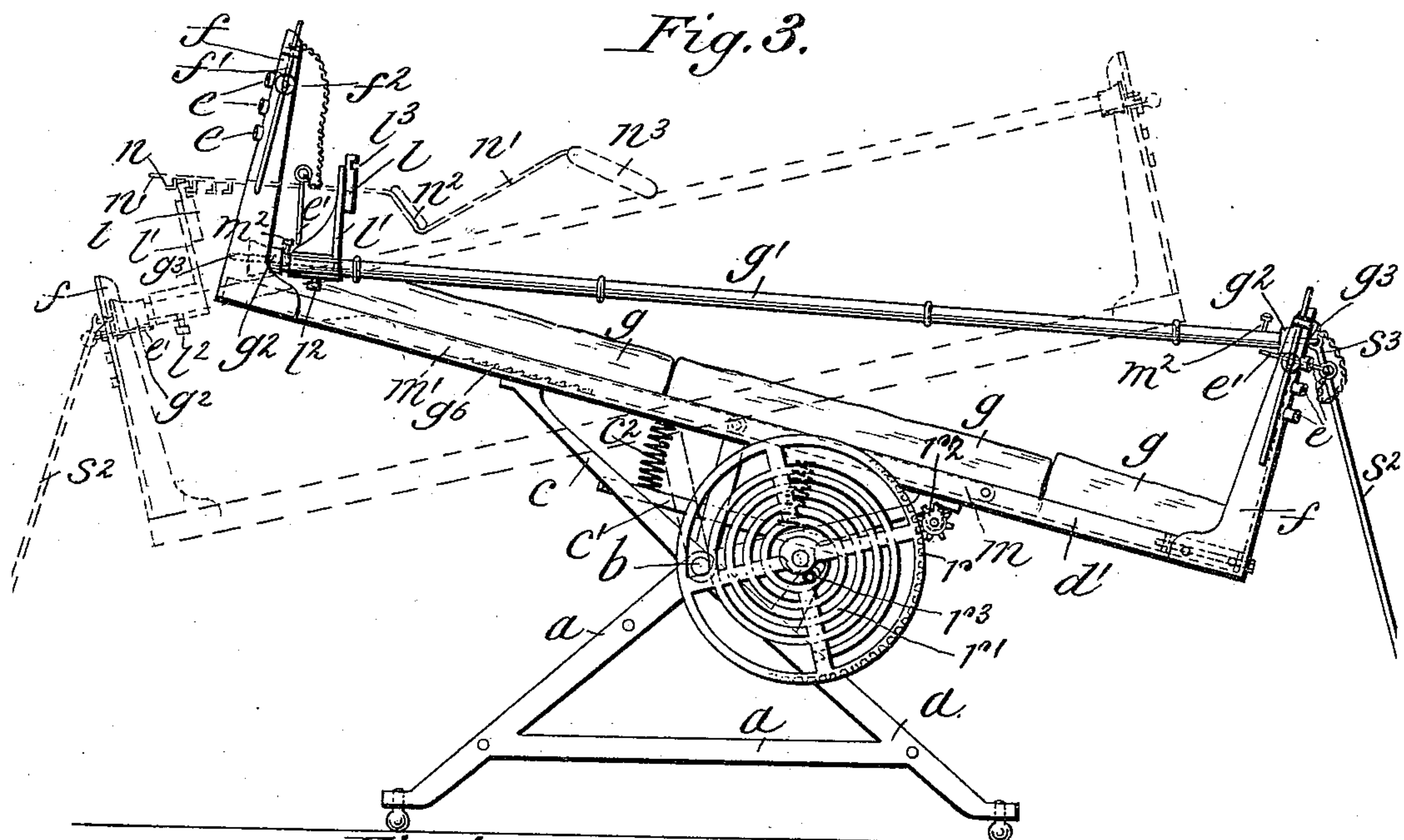
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# UNITED STATES PATENT OFFICE.

GEORGE ELMER GORHAM, OF ALBANY, NEW YORK.

## INVALID-BEDSTEAD.

SPECIFICATION forming part of Letters Patent No. 525,952, dated September 11, 1894.

Application filed December 23, 1893. Serial No. 494,533. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE ELMER GORHAM, a citizen of the United States, residing at Albany, in the county of Albany and State of New York, have invented certain new and useful Improvements in Invalid-Bedsteads; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain new and useful improvements in and relating to invalid bedsteads, and is designed to furnish a construction thereof of such a character that the invalid may, when desired, be placed in a sitting position, or, while still prone upon the surface of the bed, may be tilted with it so as to assume an inclined position of suitable degree, or even to be raised entirely from the bed surface and suspended upon a stretcher while the bed clothes are being changed or ventilated, the necessary manipulations for these various purposes being adapted to be exercised with safety by a single attendant without discomfort to the invalid and with the expenditure of but little power. These capabilities of my improvement I have embodied in a structure of substantial strength and stability, of comparative cheapness in point of manufacture, and of such simplicity that its mode of manipulation can readily be comprehended and practiced by persons having but a moderate familiarity with or aptitude for mechanical operations. Minor features of my invention relate to the detail construction of the several parts, as will hereinafter more fully appear.

In the accompanying drawings, Figure 1 represents a perspective view of the bed and its principal accessories, in an inclined position. Fig. 2 represents a like view of the upper portion of the structure, showing the stretcher in its elevated position. Fig. 3 represents a side elevation of the bed and stretcher frame, illustrating further, by the aid of dotted lines, the manner of using the stretcher. Fig. 4 represents an end elevation and partial section, of the parts shown in Fig. 3. Fig. 5 represents a side elevation, partly in section of the removable seat rest. Fig. 6

represents a front elevation of a suitable form of shoring device to assist in the operation of raising the invalid from the bed mattresses and supporting him above the same upon the stretcher. Fig. 7 represents a plan view of a portion of the stretcher frame illustrating its employment in applying extension to a broken leg.

Similar letters of reference indicate similar parts throughout the several views.

Referring to the drawings, it will be noted that the superstructure upon which the tiltable bed bottom is supported consists preferably of stout metallic side pieces *a* of general triangular contour, connected and braced to form a stable support by means of the cross pieces *a'*. To the summit or apex of each side piece of this superstructure is attached a rock-pin *b*, upon which is adapted to rock the corresponding triangular side piece *c* of the frame to which the bed bottom is attached, said side pieces being connected to form said frame by means of the cross piece *c'*, which serves as a support for the springs *c<sup>2</sup>* whereby the center of the woven wire mattress *d* is prevented from sagging.

The woven wire mattress is secured in any suitable manner within the bed bottom frame, which is preferably made up of side pieces *d'* and connecting end pieces. At the corners of this frame are fixedly attached the upright angle-iron posts or standards *f*, connected at their upper ends, if need be, by the bent rods *f'* whose ends are adapted to enter the perforated lugs *f<sup>2</sup>*, and to be secured therein, at the convenient vertical adjustment desired, by means of set screws as shown. The standards are also provided with a series of lugs or bosses *e* each of which is apertured longitudinally, the apertures extending entirely through the standard at the angle thereof, so that a pin (as *e'*, connected to the standard by a chain) may be passed through any of said apertures, so as to project within the angle for a purpose hereinafter described.

The bed bottom is adapted to support the usual hair mattress sections *g*, which are held in place by a vertically movable frame consisting of the tubular side pieces *g'*, having end caps *g<sup>2</sup>* which enter the angles of the corner standards and which are perforated



so as to be connected by cross rods  $g^3$  whose bent ends pass through the caps and into the tubular side pieces wherein they may be secured by means of set screws  $m^2$ . The frame thus serves to retain the mattress sections in place and is particularly useful for that purpose when the bed is tilted. It also constitutes the frame of a stretcher whereby the invalid may be raised from the mattresses, as will hereinafter more fully appear. For convenience I will therefore refer to it as the stretcher-frame.

The stretcher-frame is provided with a foot-rest consisting of a transverse piece  $l$  supported upon the sliding standards  $l'$  which may be fixed in place at the desired adjustment by means of the set screws  $l^2$ . The foot-rest may also be provided with a groove  $l^3$ , within which are adapted to engage the hook-shaped projections  $n$  of a seat rest, whose construction is shown in Figs. 1 and 5. It consists of the bent tubular bars  $n'$  connected by the cross pieces  $n^2, n^3$ , the latter of which may have an aperture as shown so as to be employed in connection with the usual insertible bed-pan shown in dotted lines at  $n^4$  in Fig. 5. When the bed is in the inclined position, the buttocks of the invalid may rest upon the seat  $n^3$  and his feet upon the cross piece  $n^2$ . The engagement of the hooks  $n$  within the groove  $l^3$  is an efficient safeguard against danger of displacement or fall of the seat rest, while at the same time the construction and relationship of parts is such as to permit higher or lower adjustment of the seat rest with respect to the foot board  $l$  to be effected quickly and with safety. A table rest may also be provided, consisting of a removable board  $m^2$  adapted to rest upon the jointed strips  $m, m'$ , the former being pivoted to the side piece  $g$ , and the latter engaging with a ratchet  $g^6$  upon the inner face of said side piece. When the table rest is not in use the board  $m^2$  is removed and the strips  $m$  released from engagement with the ratchets  $g^6$ , and the joint straightened out so as to dispose both strips alongside of the side bars of the stretcher frame, as indicated in Figs. 2, 3 and 4. It is obvious that the seat rest and table rest can be used conjointly, as indicated in Fig. 1. Where it is impracticable to use the seat rest, the body may be partly supported by the foot board  $l$ , when the bed is tilted, and the table rest may be used without the seat rest.

The main characteristic feature of my invention is that I am enabled by its use to bring the invalid into the various positions contemplated without making any break or joint in the bed bottom frame, and by the aid of mechanism which remains set in the position of adjustment in which it is placed, without liability of accidental derangement. To this end, the bed bottom is mounted upon the sub-structure or support at or near the center, and the mechanism acts simultaneously from both sides of the bed by reason of the connecting gearing used, and is of such a

character that it can only be actuated by means of the hand wheel or the like employed for the purpose. Thus, as shown in the drawings, scroll wheels  $A$  provided at their peripheries with gear teeth  $r$  and with a volute  $r'$ , are mounted in suitable bearings upon the side pieces, and are geared together by a cross shaft and pinions  $r^2$ . A pin  $r^3$  for each wheel  $A$  engages with the volute of said wheel, so that by turning either wheel, the bed bottom is caused to be correspondingly tilted, the power, to whichever wheel applied, being thus distributed to both sides of the bed simultaneously and insuring the regular and steady movement of the bed bottom, without jar to the invalid, and with the strains properly equalized upon the structure as a whole. I do not wish to be understood as limiting myself to the employment of scroll gearing, as broadly considered my invention includes as well the employment of other gearing adapted to transmit the power to both sides of the bed simultaneously, while imparting a tilting motion thereto.

I will now describe the manner of utilizing the stretcher frame for lifting the invalid clear of the bed bottom, in order that the mattress and bed clothing may be changed or ventilated. The bottom of the stretcher is constituted by the sections of stout canvas  $s$  having folded edges as indicated in Fig. 2 for the reception of the insertible rods  $s'$ . These folded edges are provided with cut away portions as indicated, so that the side bars  $g'$  of the stretcher frame may be readily connected to the insertible rods  $s'$  by means of the S-shaped hooks and buckle straps. It is evident that if the condition of the invalid will admit of it, these sections of canvas  $s$  may be drawn under him, the connection made between the side bars  $g'$  of the stretcher frame and the insertible rods  $s'$ , and if a sufficient number of attendants are at hand the stretcher frame may be raised bodily within the corner standards and suspended in the elevated position by inserting the pins  $e'$  through the perforated lugs or bosses  $e$ . My invention, however, affords facilities for thus lifting and suspending the invalid, by the aid of a single attendant and with great facility. To this end the attendant is provided with a shoring piece preferably of the kind illustrated in Fig. 6, and consisting of a rod  $s^2$  having forked arms  $s^3$  notched at their ends in such manner as to be adapted to engage with the end bars  $g^3$  of the stretcher frame. While the bed bottom is in the horizontal position, the attendant places the shoring piece beneath one of the end bars of the stretcher frame in the manner indicated in Fig. 3 and thereupon by means of the scroll wheel causes the bed bottom to tilt toward the shoring piece. During this first tilting operation the end of the stretcher frame supported by the shoring piece remains stationary, and when the tilting operation is completed, pins  $e'$  are inserted through the per-



forated bosses *e* and the shoring piece is removed whereupon that particular end of the stretcher frame remains suspended at the desired height from the angle iron corner supports. The bed bottom is thereupon tilted in the reverse direction and at the appropriate time the shoring piece is inserted beneath the opposite end bar of the stretcher frame and the tilting further continued until said opposite end of the stretcher frame is also raised from the level of the bed bottom and supported by the pins *e'* of the appropriate angle iron corner posts, all as indicated in dotted lines in Fig. 3. The bed may then be tilted back to the horizontal position indicated in Fig. 2, whereupon the invalid remains suspended upon the stretcher above the bed clothing and mattress.

When the mattress and bed clothing have been changed or ventilated, the invalid may be returned to the surface of the bed by lowering the stretcher frame in a succession of operations the reverse of those just described as will be readily understood. It will be evident that in inserting the canvas stretcher sections beneath the invalid, that operation can be facilitated by inserting the upper sections of fabric at the time that the bed is tilted in such manner as to throw the weight of the body upon the lower part, and that the lower section of the fabric may be inserted in place when the bed is tilted in such manner as to throw the weight of the body upon the upper part, and if necessary the seat rest and foot rest may be employed to facilitate or render more comfortable to the invalid the operation of inserting these sections of canvas beneath him. It will, of course, be understood that when the S-shaped hooks are connected to the insertible rods *s'* so as to join said rods to the proximate side bar *g'*, the buckle straps on the opposite side bar *g'* of the stretcher frame are utilized to bring the canvas into a state of tension suitable to support the invalid as firmly as possible.

By loosening the set screws *m*<sup>2</sup>, partially pulling out the end rods *g*<sup>3</sup>, and again tightening the set screws, the stretcher frame becomes elongated and the end rods are thus more readily accessible when the stretcher is to be lifted. Furthermore, this feature of extensibility of the end rods enables the stretcher frame to be usefully employed in applying extension to a broken leg. As illustrated in Fig. 7, this may be done by attaching a coil spring scale *m*<sup>3</sup> to the end rod, and to the properly applied adhesive straps as shown. The end rod is then pulled out or extended until the spring scale registers the number of pounds corresponding to the extension desired, whereupon the set screws are tightened.

Having thus described my invention, what I claim is—

1. An invalid bedstead, comprising a supporting stand, a bed bottom tiltable longitudinally thereon into planes oppositely inclined with respect to a horizontal plane, means for

tilting the bed bottom into the one inclination or the other, a seat, and means for removably securing the seat in place upon the bed bottom; whereby the tilting motion of the bed bottom may be utilized, first, to facilitate the insertion of the seat beneath the invalid, and then to bring him into the sitting position; substantially as described.

2. An invalid bedstead, comprising a supporting stand, a bed bottom tiltable longitudinally thereon into planes oppositely inclined with respect to a horizontal plane, means for tilting the bed bottom into the one inclination or the other, and a stretcher made up of a frame, and independently insertible and removable body supporting cross strips; whereby on tilting the bed bottom forward the insertion of one of the cross strips is facilitated, and on tilting the bed bottom rearward, the insertion of the other cross strip is facilitated; substantially as described.

3. An invalid bedstead, comprising a supporting stand, a bed bottom mounted centrally upon the stand and located entirely above the stand and adapted to be tilted longitudinally thereon, and gearing intermediate of the stand and bed bottom and connecting the two, said gearing being of a character that can be freely operated in either direction by the attendant and which will remain automatically set at any adjustment to which the attendant may operate it; whereby the bed-bottom may be tilted longitudinally upon the stand into any desired position and will remain automatically fixed therein, substantially as described.

4. An invalid bedstead, comprising a supporting stand, a bed bottom mounted upon the stand and adapted to be tilted longitudinally thereon, and gearing intermediate of the stand and bed bottom and connecting the two, said gearing being of a character that can be freely operated in either direction by the attendant, and which will remain automatically set at any adjustment to which the attendant may operate; substantially as described.

5. An invalid bedstead, comprising a supporting stand provided with a pin projection, a bed bottom mounted to tilt upon the stand, and a scroll wheel connected to the bed bottom and having its spiral engaged by the pin projection; substantially as described.

6. An invalid bedstead, comprising a supporting stand provided on opposite sides with a pin projection, a bed bottom mounted to tilt upon the stand, scroll wheels connected respectively to opposite sides of the frame and each having its spiral engaged by one of the pin projections, and connecting gearing uniting the scroll wheels; substantially as described.

7. An invalid bedstead, comprising a supporting stand, and a bed bottom mounted to rock upon the stand, opposite sides of the bed bottom being geared to the stand and to each other; substantially as described.



8. In an invalid bedstead, the combination with a longitudinally tiltable bed bottom provided with standards, of a stretcher frame resting upon the bed bottom, and means for supporting the stretcher frame from the standards; substantially as described.

9. In an invalid bedstead the combination with the longitudinally tiltable bed bottom provided with standards at its corners, of a stretcher-frame having its side bars extending within said corner standards, and adjusting pins for supporting the stretcher frame from the standards; substantially as described.

10. In an invalid bedstead the combination with the tiltable bed bottom having ratcheted side bars, of a table rest consisting of a removable top and a pair of jointed rods each pivoted at one end to a side bar of the bed bottom, and adapted to engage at the other end with one of the side bar ratchets; substantially as described.

11. In an invalid bedstead, a stretcher frame having an end bar extensible with respect to the side bars and means for connecting said end bar to the invalid's leg, said means including a registering scale; substantially as described.

12. In an invalid bedstead, the combination with the tiltable bed bottom and stretcher frame, of a seat rest and means for supporting the seat rest upon the stretcher frame; substantially as described.

13. In an invalid bedstead, a seat rest consisting of a frame made up of a seat, a cross piece for the feet and side pieces connecting

the seat and cross-piece, said side pieces having adjusting projections at their lower ends, in combination with a supporting piece mounted upon the bedstead and with which said adjusting projections are adapted to engage; substantially as described.

14. In an invalid bedstead, a seat rest consisting of a frame made up of a seat, a cross piece for the feet, and side pieces consisting of bent bars, connecting the seat and cross piece and provided with adjusting projections at their lower ends, in combination with a supporting piece mounted upon the bedstead and with which said adjusting projections are adapted to engage; substantially as described.

15. In an invalid bedstead, a foot rest having a longitudinal groove in combination with a seat rest having, at the lower ends of the side bars of its frame, downwardly and forwardly projecting hooks adapted to engage within said groove; substantially as described.

16. In an invalid bedstead, the combination with the stretcher frame, of a tilting bed bottom having corner posts of angle iron apertured at the angle, and pins adapted to be inserted through the apertures so as to afford supports for the stretcher frame; substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE ELMER GORHAM.

Witnesses:

CHARLES F. BRIDGE,

CAROLYN S. CHEEVER.