

No. 763,156.

PATENTED JUNE 21, 1904.

J. CHRISTENSEN.

SOFA BED.

APPLICATION FILED JAN. 30, 1904.

NO MODEL.

3 SHEETS—SHEET 1.

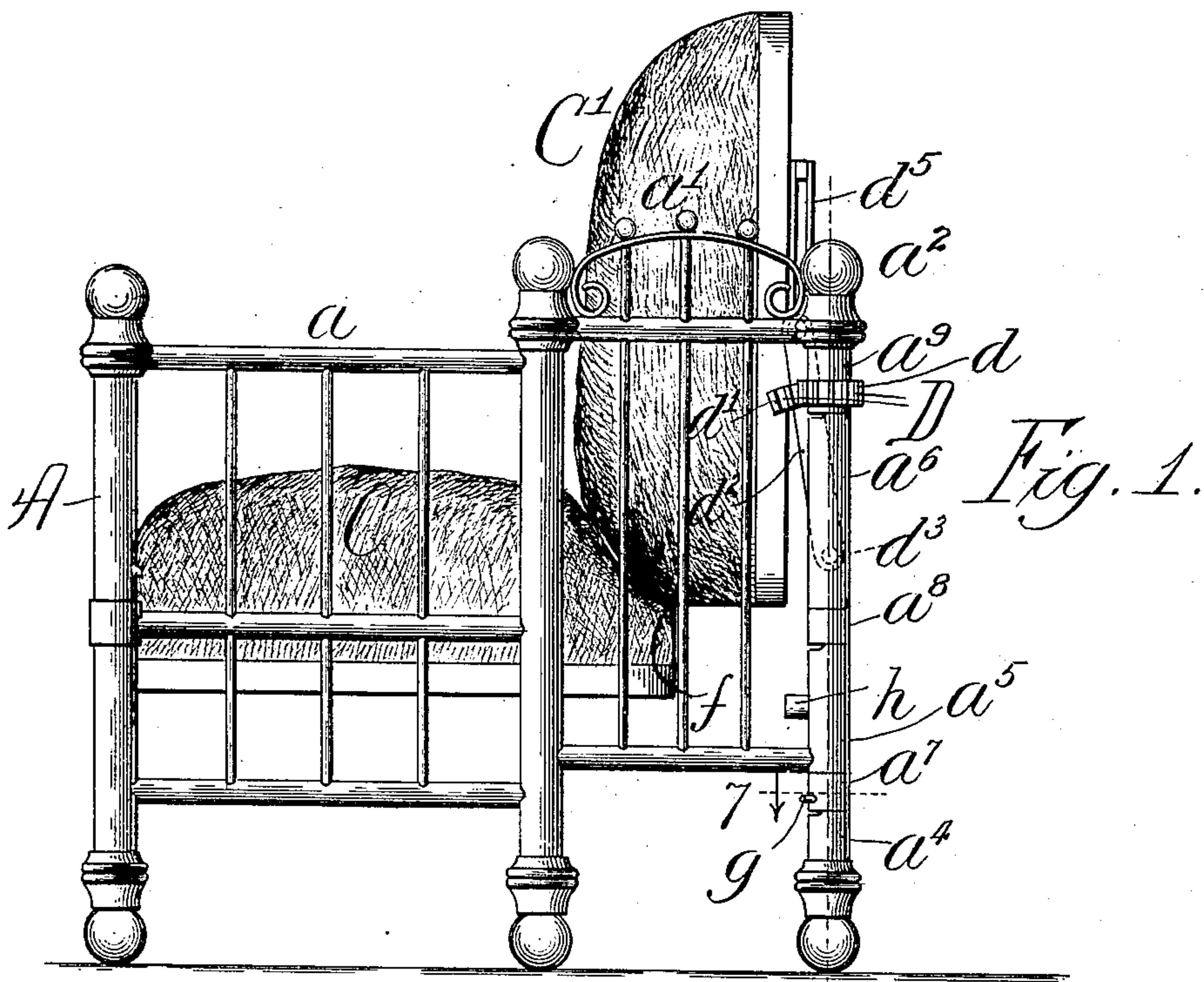
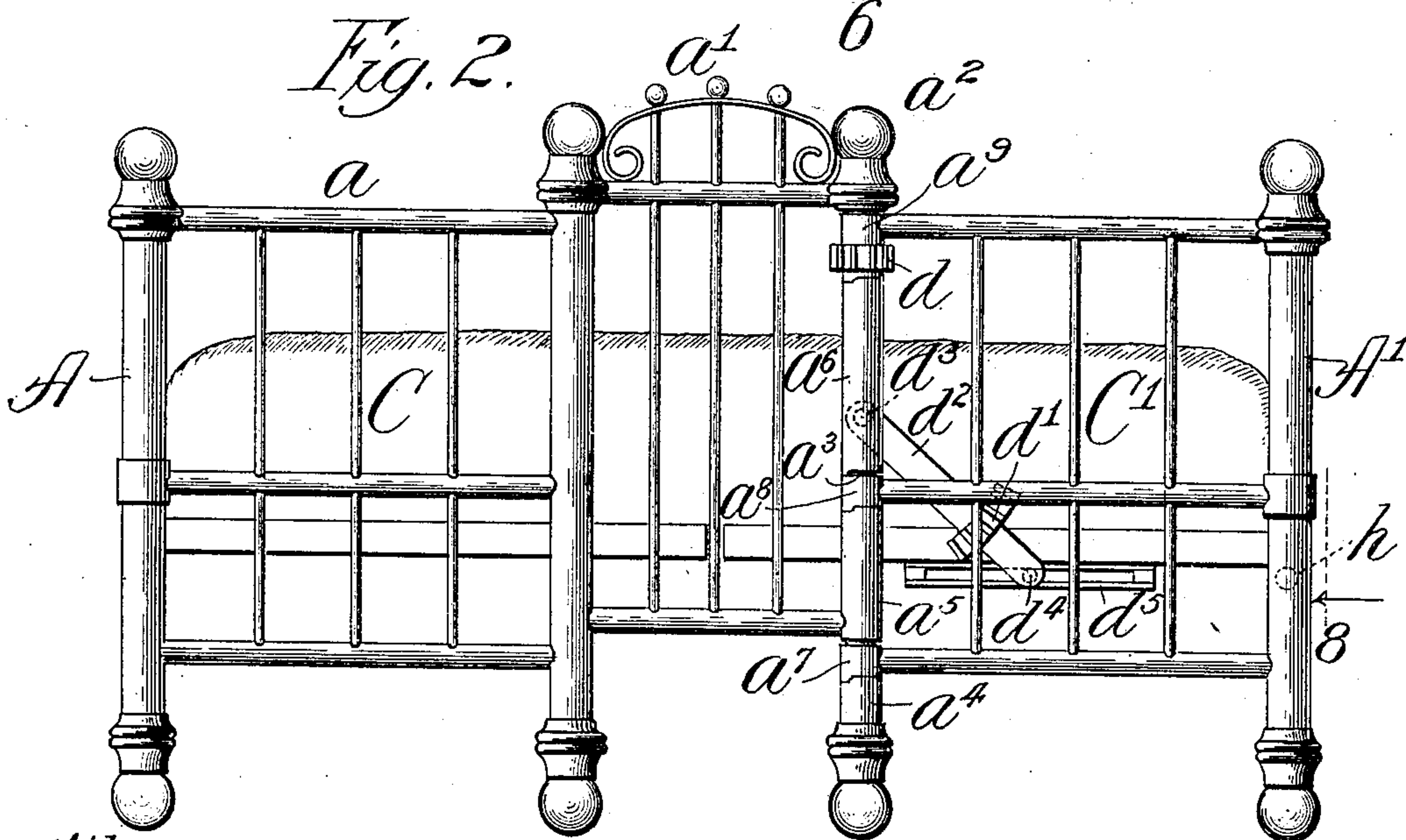


Fig. 2.



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3 SHEETS—SHEET 2.

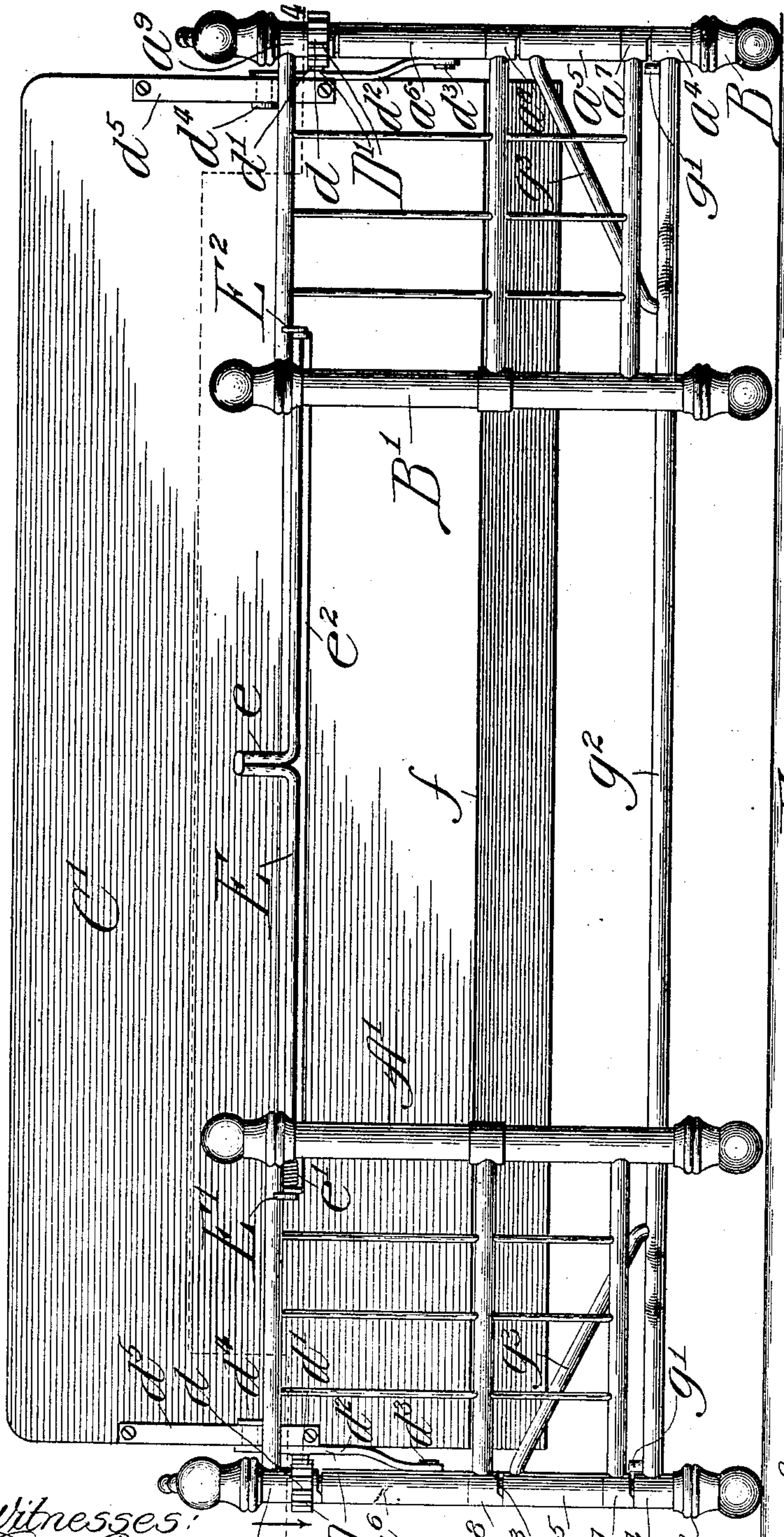


Fig. 3.

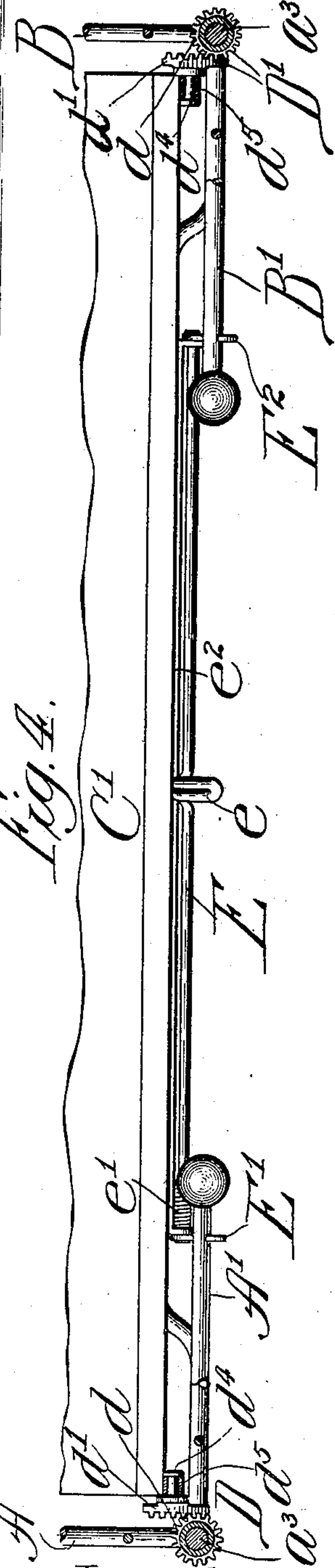


Fig. 4.

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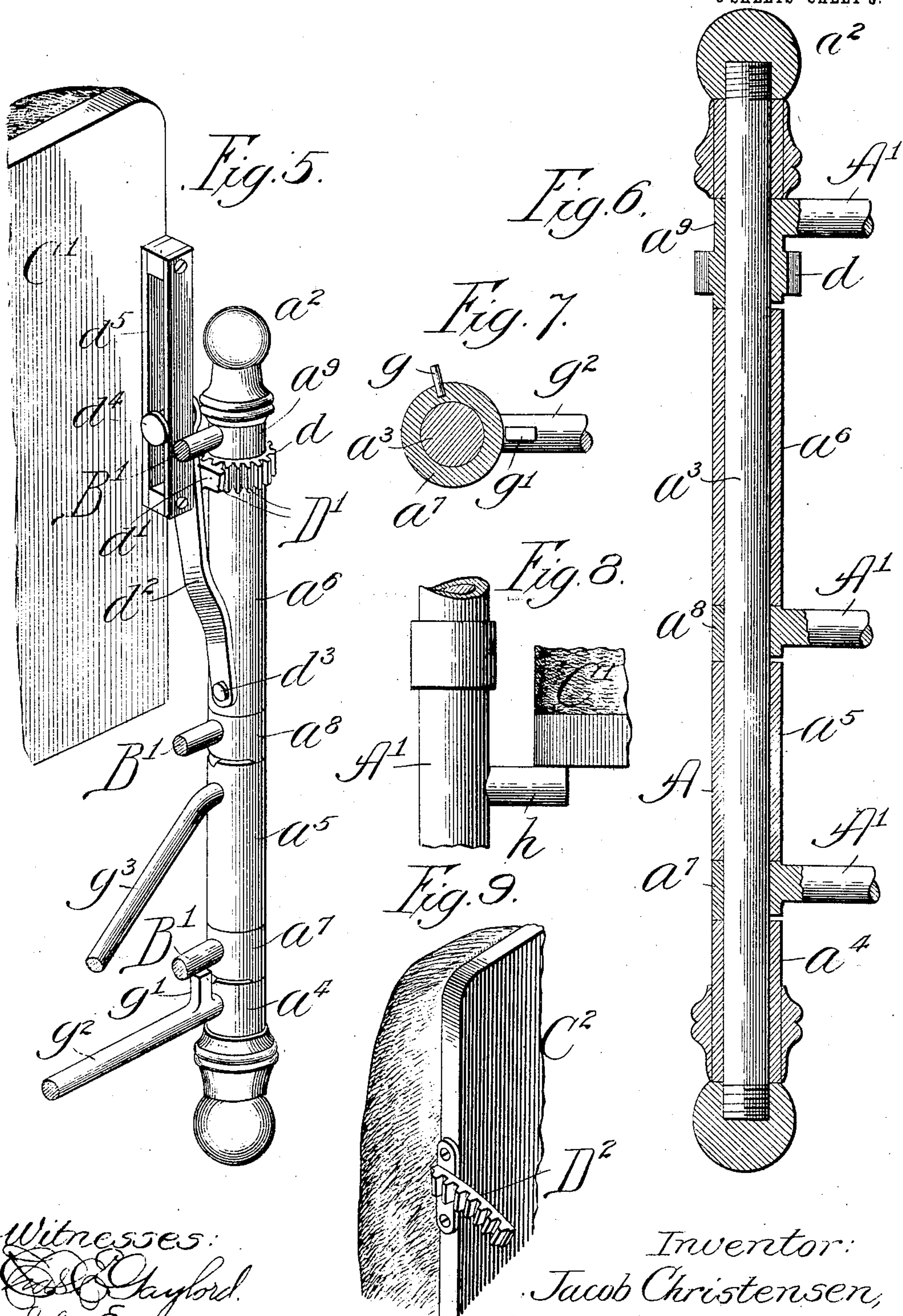
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3 SHEETS—SHEET 3.



Witnesses:
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UNITED STATES PATENT OFFICE.

JACOB CHRISTENSEN, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE GARVY COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SOFA-BED.

SPECIFICATION forming part of Letters Patent No. 763,156, dated June 21, 1904.

Application filed January 30, 1904. Serial No. 191,348. (No model.)

To all whom it may concern:

Be it known that I, JACOB CHRISTENSEN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Sofa-Beds, of which the following is a specification.

My invention relates particularly to sofa-beds of the type wherein a frame is employed having swinging end sections or gates adapted to be swung behind the back of the sofa in the closed condition and to be extended in alignment with the fixed end sections of the frame in the open condition.

My primary object is to provide for the automatic actuation of the swinging end sections of the frame in this class of construction.

A further object is to provide for the automatic elevation of the end sections during the initial movement in the closing operation, whereby injury to the floor is avoided.

Still another object is the provision of an improved lock for the swinging end sections of the frame.

The invention is illustrated in its preferred embodiment in the accompanying drawings, in which—

Figure 1 represents an end elevational view of my improved sofa-bed in the closed condition; Fig. 2, a similar view of the same in the open position; Fig. 3, a rear elevational view of the same in the closed condition; Fig. 4, a broken plan section taken as indicated at line 4 of Fig. 3; Fig. 5, an enlarged broken rear perspective view showing one of the connections whereby the swinging end sections of the frame are automatically actuated when the back or swinging leaf of the sofa is raised or lowered; Fig. 6, a vertical section taken as indicated at line 6 of Fig. 1; Fig. 7, a plan section taken as indicated at line 7 of Fig. 1; Fig. 8, a broken rear elevational view taken as indicated at line 8 of Fig. 2 and illustrating the manner in which the free edge of the back is supported in the open condition, and Fig. 9 a broken rear perspective view of the back and showing a modification of the leaf-carried member of one of the gate-actuating devices.

The preferred construction is as follows: 50

A and B represent stationary end sections of the bed-frame; A' B', permanently-upright swinging end sections or gates of the bed-frame; C, the seat or stationary section of the bed-bottom; C', the back swinging leaf or swinging section of the bed-bottom; D D', leaf-actuated gate-actuating devices, and E a locking device equipped with hooks or latches E' E² for securing the gates in the closed position. 60

The frame may be of any suitable design; but I preferably form each stationary end section of a front section *a* and a rear section *a'* of somewhat greater height, and I make the gates to correspond with the sections *a*. In this manner a striking and pleasing effect is secured when the article is used as a sofa and symmetry is secured when the article is used as a bed. Moreover, the top rails of the section *a* are of the proper height to form arm-rests for the sofa. The rearmost post *a*² of each stationary end section comprises an inner shaft *a*³ and fixed sleeves *a*⁴ *a*⁵ *a*⁶ thereon. Each gate has its horizontal tubes or members fixedly joined to sleeves *a*⁷ *a*⁸ *a*⁹, journaled on the corresponding shaft *a*³. Vertical play of the last-mentioned sleeves is permitted, and each rotatable sleeve *a*⁷ is provided at its lower end with a cam which rests upon a coacting cam at the upper end of the subjacent fixed sleeve. The construction is such that each gate is bodily lifted a small fraction of an inch during the initial portion of its inward swing, and thereafter the gate has merely its pivotal movement. 85

Each of the gate-actuating devices D D' comprises a pinion *d*, fixed to the corresponding rotatable sleeve *a*⁹, and a gear-segment *d'*, adapted to actuate said pinion and supported on a member *d*², pivotally connected at *d*³ to the post and provided at its free end with a stud *d*⁴, having sliding engagement with a guide *d*⁵, with which the corresponding end of the swinging leaf of the sofa is provided. In the construction shown the pivot of the leaf C' is at the line *f f*, as shown in Figs. 1 and 3. The sliding connection between the members *d*² and their guides is necessitated 95

by reason of the fact that the members d^2 swing about one axis, while the leaf of the sofa swings about another axis. The connection is such that the members d^2 , with their guides, virtually form braces for the sofa-back. The cams at the pivotal connections of the gates are of such form that the gates are virtually locked in the extended position by the cams themselves. I prefer to provide, however, positive stops g on the sleeves a^7 , which engage coacting stops g' on the rear connecting member g^2 , joining the stationary end sections of the frame. The member g^2 is provided with braces g^3 , connected with the upper portions of the sleeves a^5 . The swinging post of each gate is provided with a stop h , which serves as a bearing for the free edge of the swinging leaf of the sofa in the open position of the bed. These stops may be replaced by any suitable bearing on the inner surfaces of the gates adapted to support the leaf when the latter is lowered.

The lock E comprises a longitudinally-extending rod equipped at its central portion with an upwardly-projecting handle e and carrying at its ends the latches E' E^2 . A coil-spring e' serves normally to hold the latches in the locking position. The longitudinal rod is supported in a bracket e^2 , with which the rear or lower surface of the back of the sofa is equipped. The handle e is accessible either from behind the sofa or by reaching over the top of the back when the latter is in its elevated position. If desired, means may be provided for releasing the lock from any other convenient position.

From the foregoing description it will be understood that in order to convert the article from a sofa-bed to a bed it is necessary only to release the gate-locks and swing the back downwardly to the horizontal position. In the first portion of this movement of the back the gates are automatically actuated by reason of the temporary engagement of the gear-segments with the pinions connected with the gates. As soon as the gates are extended the gear-segments pass from engagement with the pinions and the back drops freely to the horizontal position, in which position it is supported by the stops h . As the gates approach positions in alinement with the stationary end sections of the frame they are automatically lowered to bear firmly upon the floor. In converting the article from a bed to a sofa it is necessary only to raise the swinging section of the bed-bottom, thereby carrying the gear-segments from the position indicated in Fig. 2 to the position indicated in Fig. 1. During the last portion of the movement of the gear-segments they are brought again into engagement with their pinions, thereby swinging each gate inwardly through a quarter-turn, the gates being automatically lifted from the floor in the manner described during

the initial portions of their inwardly-swinging movements.

In Fig. 9 I have shown a modification of the gate-actuating mechanism. In this figure C^2 represents the swinging section of the bed-bottom, and D^2 represents a gear-segment rigidly secured to one end of the section C^2 . It is understood, of course, that the opposite end of the swinging section of the bed-bottom is similarly equipped. In this modification the gear-segments serve to engage pinions connected with the pivotal portions of the gates in the manner above described. In this construction, however, it is necessary to correctly design the teeth of the pinions and gear-segments to prevent binding, owing to the fact that the swinging section of the bed-bottom is pivoted at some distance in front of the pivot-posts of the gates. It will be noted also that the gear-segments in this construction must necessarily have a slight sliding movement with relation to their pinions, inasmuch as the sofa-back is being lowered somewhat at the time that the gear-segments are passing the pinions. Those skilled in the art of designing gears and cams may readily supply the desired form of cam-teeth to effect the desired purpose and prevent binding between the gear-segments and their pinions.

It is noteworthy that in each of the described constructions the swinging gates of the frame are equipped with members whereby the gates may be actuated, and the back of the sofa serves to actuate or carry members for actuating the members connected with the gates while the back is being swung through the upper portion of its arc of movement, thereby permitting the gates to clear the back when the bed is being opened and the back to clear the gates when the bed is being closed.

It is obvious that different mechanical devices may be employed for effecting the automatic actuation of the gates during the movement of the swinging leaf of the bed-bottom; but in every construction it will be necessary to provide lost-motion connection between the back and the gates, whereby the gates shall be actuated while the back is swinging through the upper portion of its traverse. I wish to be understood, therefore, as intending in the appended claims to cover broadly the automatic actuation of the gates through the medium of the sofa-back, this being, so far as I am aware, a wholly novel accomplishment, notwithstanding the fact that the want of means for accomplishing this purpose has been distinctly felt for a long time. The gear-segments may be of any desired form and may be replaced by any suitable members equipped with shoulders or means for engaging the pinions. The pinions themselves may be of any suitable form and may be reduced to segments, if desired. It is desirable that the pinions and gear-segments shall be in engage-

ment in the vertical position of the sofa-back, so that the sofa-back will be firmly secured while in the vertical position.

What I regard as new, and desire to secure by Letters Patent, is—

1. In a sofa-bed, the combination of a main frame provided with permanently-upright end sections swinging upon vertical pivots, a seat, a backwardly-swinging back supported on a horizontal pivot, and means for automatically actuating the movable frame-sections during movement of said back.

2. In a sofa-bed, the combination of a main frame having permanently-upright swinging end sections with vertical pivots, a seat, a backwardly-swinging back supported on a horizontal pivot, actuating members connected with said swinging end sections, and means actuated by said back and serving to actuate the end-section-actuating members while the back is swinging through the upper portion of its arc of movement, for the purpose set forth.

3. In a sofa-bed, the combination of a frame having permanently-upright swinging end sections, a seat, a backwardly-swinging upright back behind which said end sections are folded, actuating members connected with the pivotal portions of the swinging end sections, and back-actuated members engaging said first-named actuating members while the back is moving through the upper portion of its arc of traverse.

4. In a sofa-bed, the combination of a frame having swinging end sections equipped at their pivotal portions with pinions, a seat, a swinging back, and back-actuated gear-segments serving to engage said pinions when the back is near its vertical position, for the purpose set forth.

5. In a sofa-bed, the combination of a frame having swinging end sections equipped with pinions, gear-segments having pivotal connection with the pivot-posts of the swinging end sections, a seat, and a swinging back having sliding connection with said gear-segments, for the purpose set forth.

6. In a sofa-bed, the combination of a frame having swinging end sections equipped with pinions, a seat, a swinging back, members

pivotaly connected with the pivot-posts of said swinging end sections and slidably connected at their free ends with said back and gear-segments carried intermediately on said last-named members and serving to engage the pinions when the back is near its vertical position.

7. In a sofa-bed, the combination of a frame having swinging end sections equipped at the upper portions of their pivots with pinions, a seat, a swinging back, and pinion-actuating segments connected with said back at a distance above the pivot thereof, for the purpose set forth.

8. In a sofa-bed, the combination with a frame having swinging end sections, a seat, a swinging back, and end-section-actuating connections between the swinging end sections and the back serving to brace the back in its vertical position.

9. In a sofa-bed, the combination of a main frame having permanently-upright swinging end sections, a seat, a swinging back, means for actuating the swinging end sections through the medium of the back, and means for automatically lifting the end sections during the swinging movement thereof.

10. In a sofa-bed, the combination of a frame having swinging end sections, cams on the pivot-posts of said end sections and on the pivotal portions of said end sections, whereby the end sections are lifted during their inwardly-swinging movement, a seat, a swinging back, and back-actuated means serving to actuate said swinging end sections.

11. In a sofa-bed, the combination of a frame having swinging end sections, a seat, a swinging back, back-actuated means serving to actuate said end sections, and automatic gate-latching means connected with the back.

12. In a sofa-bed, the combination with a frame having swinging end sections, a seat, a swinging back, a longitudinal spring-held rod connected with the back, gate-latches carried by said rod, and means for turning the rod to release the latches.

JACOB CHRISTENSEN.

In presence of—

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F. M. WIRTZ.