

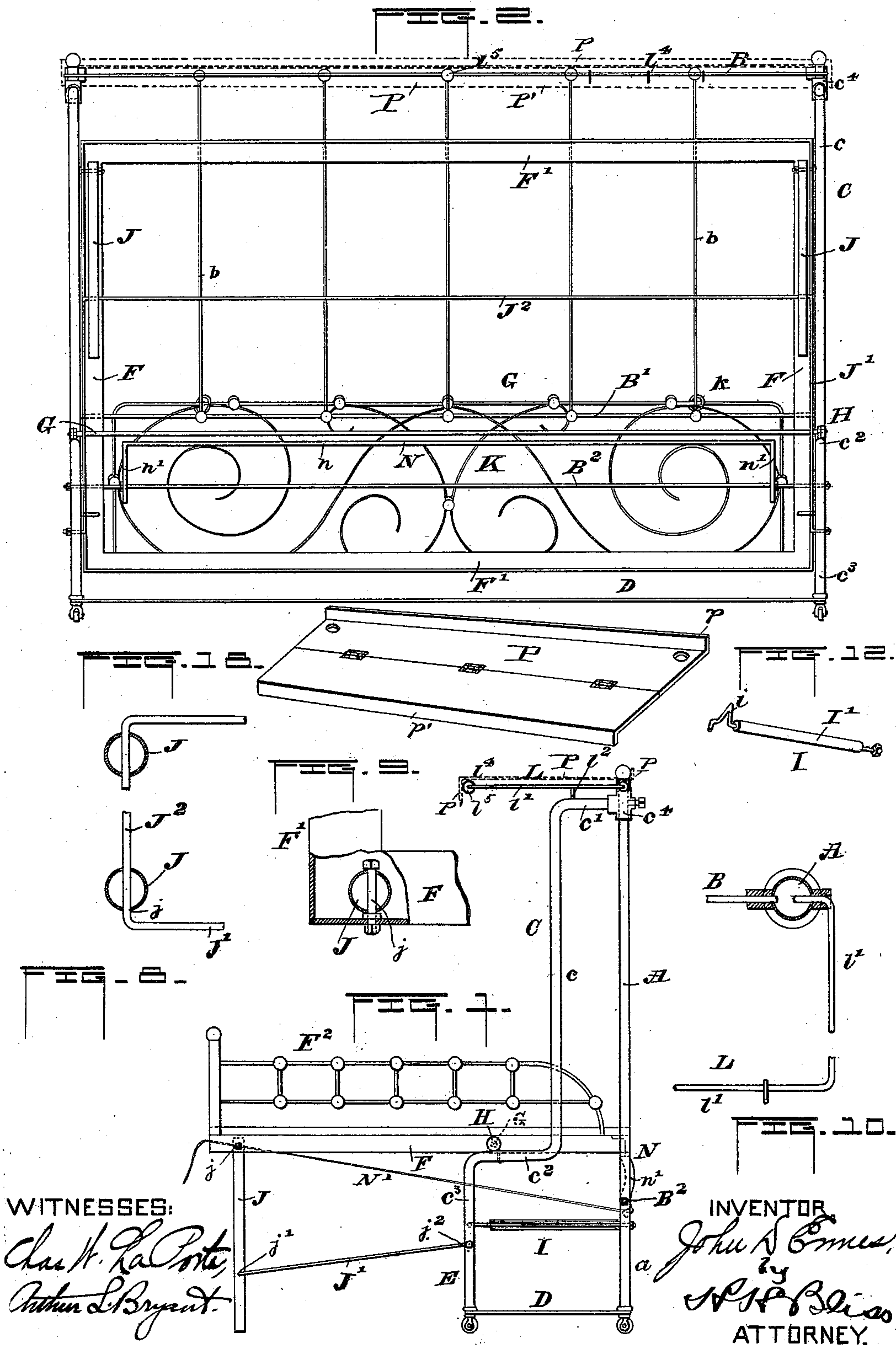
(No Model.)

3 Sheets—Sheet 1.

J. D. ENNES.
FOLDING BED.

No. 555,441.

Patented Feb. 25, 1896.



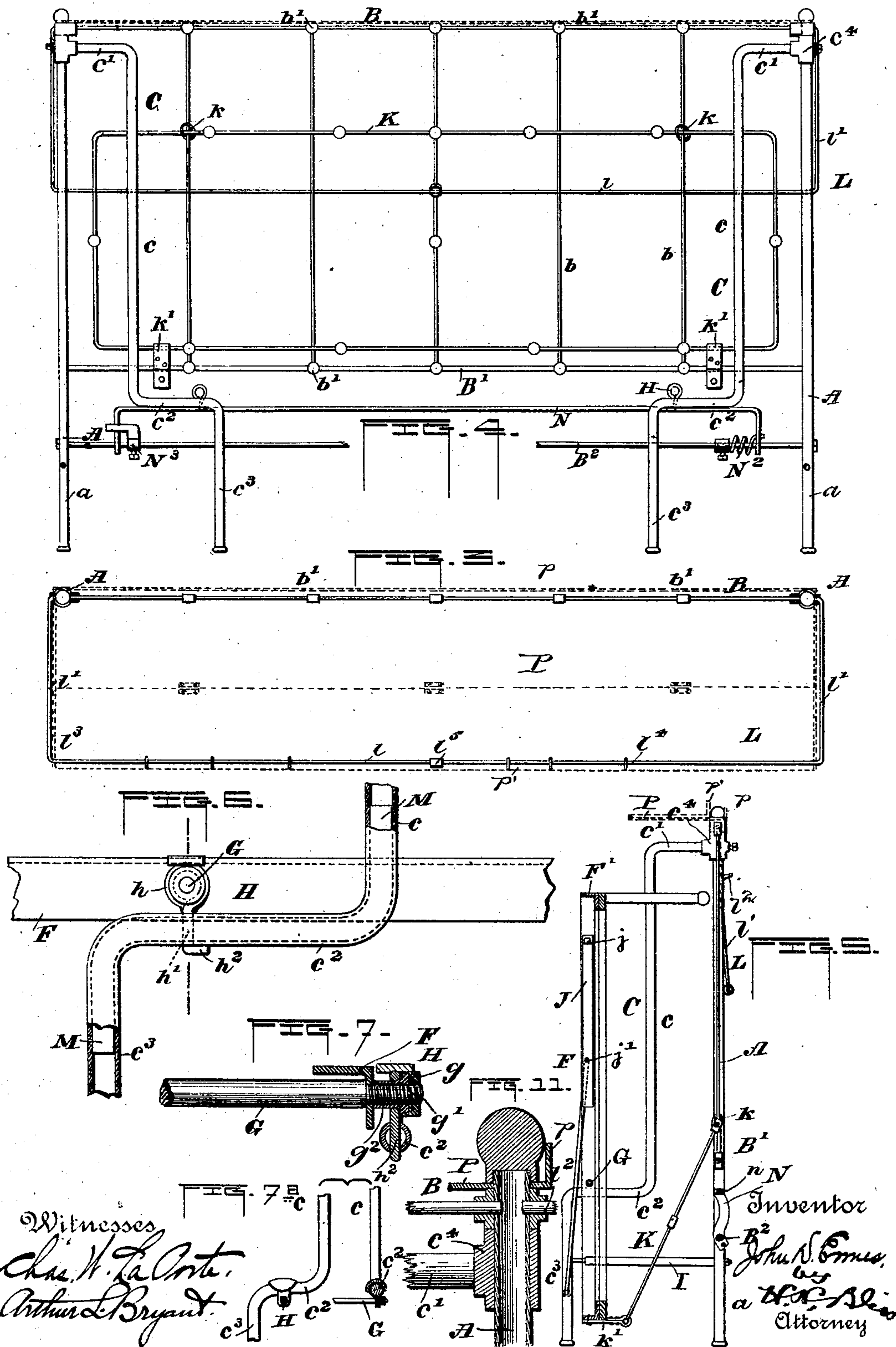
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3 Sheets—Sheet 2.

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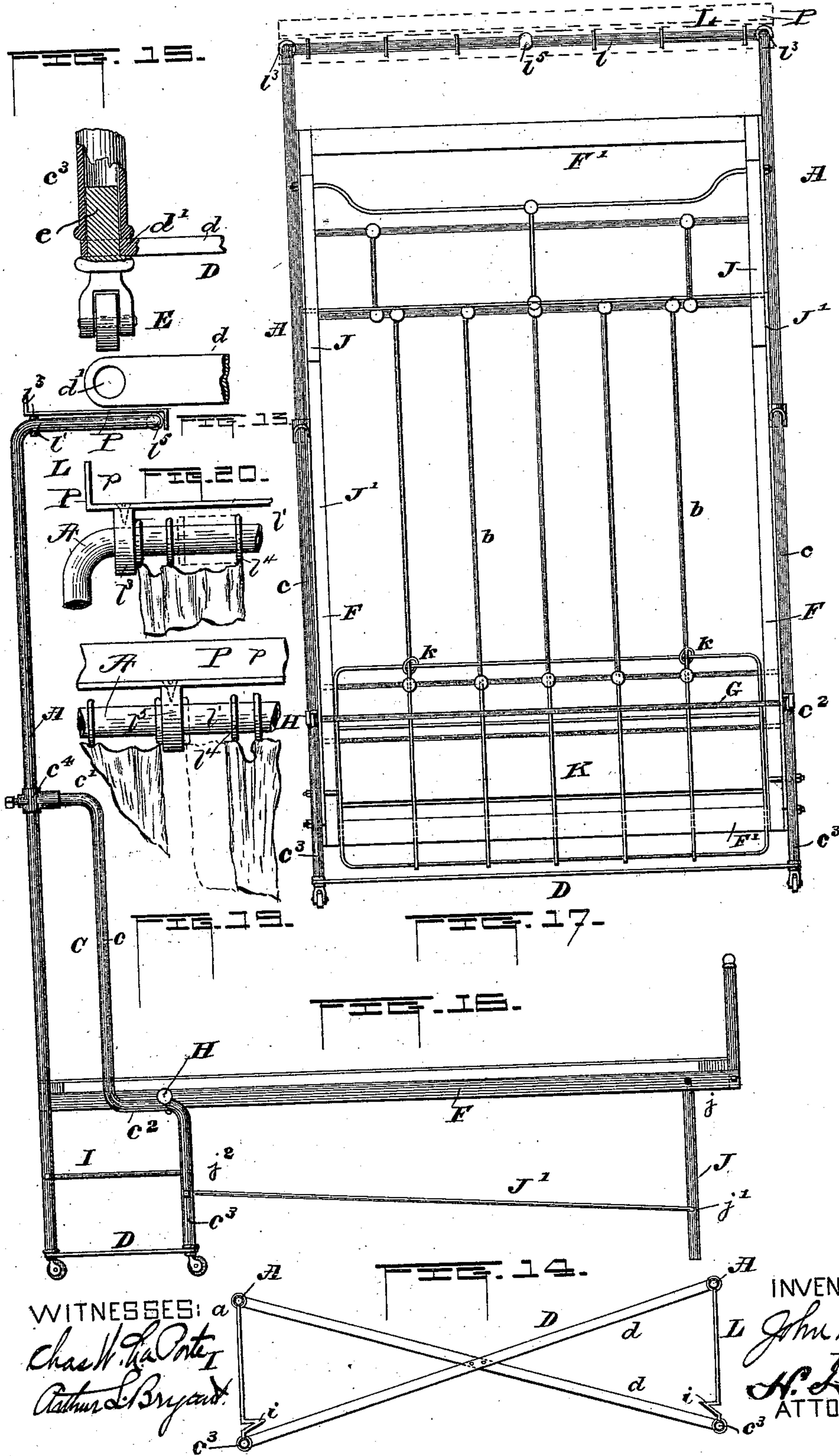
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3 Sheets—Sheet 3.

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Patented Feb. 25, 1896.



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FOLDING BED.

SPECIFICATION forming part of Letters Patent No. 555,441, dated February 25, 1896.

Application filed July 28, 1894. Serial No. 518,880. (No model.) Patented in England November 1, 1893, No. 20,689.

To all whom it may concern:

Be it known that I, JOHN D. ENNES, a citizen of the United States, residing at Norfolk, in the county of Norfolk and State of Virginia, have invented certain new and useful Improvements in Folding Beds, (for which were granted me British Letters Patent No. 20,689, dated November 1, 1893;) and I do 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Figure 1 is an end elevation of a bed embodying my improvements. Fig. 2 is a front view when the parts are folded up. Fig. 3 is a plan view of the top. Fig. 4 shows several of the parts in the position occupied when the bed is packed for transportation. Fig. 5 shows the bed folded. Figs. 6 to 15 show details. Fig. 16 is a side view of a modification, and Fig. 17 is a front view of the same when folded up. Fig. 18 shows the shelf, and Figs. 19 and 20 details of Figs. 15 and 16.

In the drawings I have shown a back frame consisting of rear corner-uprights A A. These are formed of tubing, for lightness, cheapness and strength. They are connected by an intermediate framework formed of a top bar, B, a lower bar, B', and a supplemental cross-bar B². The cross-bars B and B' are connected by vertical stays or braces b b, which are rigidly fastened to the cross-bars by rosette-like clamps or binders b', which are applied by casting them in place after the bars have been put in the sand.

C C indicate the parts of the main frame which extend forward from the corner-uprights A A. Each is composed of a vertical portion c, a short horizontal arm c', a leg c³, and longer horizontal arm c², which connects the leg c³ with the vertical part c. The upper arm, c', is joined to the corner-upright A, not rigidly, as has been the custom heretofore, but by a pivotal or swiveling joint at c⁴. By having them thus loosely connected at these points the parts of the beds can be so placed and packed together that a large number of the beds can be stored in a small space during transportation.

The frame parts C C can be turned around so as to lie substantially in the common plane of the back frame, as is shown in Figs. 4 and 5. Then in order to hold the four leg parts a a c³ c³ rigidly in the required places when the bed is set up and in use I employ the peculiar bracing-frame shown at D. It comprises two bars d d, which are crossed one upon the other and are rigidly joined at the center, as shown in Fig. 14. In the ends of each of these bars d there is an aperture d', by which the bar can engage with one of the frame-legs. Preferably the parts are so related that the bars d can be placed below the lower ends of the tubular legs and have the vertical pintles e of the casters E passed upward through the apertures d' into the interior of the tubes, as shown in Fig. 15.

When a brace or binder similar to that at D is used, the four legs, notwithstanding the presence of the pivotal or swiveling joints, are held with firmness. In fact, the lower portion of the main frame is in such case bettered to a great extent, even when the joints at c⁴ are made rigid, as by welding, in the ordinary way now followed.

The place of weakness in these beds, resulting from the tendency of the lower ends of the legs to spread, is in this bottom portion of this main frame. This I effectually overcome by constructing them in the way described. Upon this framework is pivotally supported the mattress-frame. This is shown as having the end bars, F, the side bars, F', and the rails or guards F² at the head and foot. The end bars or rails, F F, lie close to the frame parts C C and have passing through them a pivot-rod G. The ends of this rod are journaled in bearings at H, each formed of a heavy wire or rod bent to provide an eye h with a vertical bar h' which can be bent, as at h², after being passed through the arm c² of the frame. The rod G can be fastened in the bearings in any suitable way. I prefer one like that shown, there being a nut at g engaging with the journal g', the latter being seated in a thimble g² around which the bearing H fits.

It will be seen that the bed proper or mattress-support F F' cannot only be readily rocked around the axis of the rod G, but also that it can be easily lifted out of place when-

ever required, as its pivotal parts lie not below, as has been customary, but above the frame-arm c^2 upon which it rests. The nuts and thimbles can be easily withdrawn, after
5 which the mattress-support can be taken out without requiring the withdrawal of the pivot-rod G.

In order to limit the vertical motion of the bed when folding, I introduce bracing and
10 stop-rods I. These are passed through or secured to the legs a^3 , and are each formed with a shoulder or offset at i , located at such place that the downward-swinging parts of the mattress-frame impinge upon them and
15 hold them in the desired place vertically.

The outer part of the swinging portion of the bed is supported upon legs J J which are pivoted at j to the bars F, and are connected by links J' to the legs c^3 . The parts are so
20 constructed and the pivotal points at j, j', j^2 and H are so related that when the bed is folded up the axis at j shall lie somewhat inside of the line which connects the axes at j^2 and j' , there being thus provided a toggle-
25 lock which holds the bed up until it is released by the application of considerable force to one of the parts J or J' to move them outward.

To hold the bedding in place, as well as to
30 give the structure a pleasing appearance, I employ a scroll grating or grid, (indicated by K.) It is connected by straps or loops k' to the rear edge of the mattress-frame and by loose sliding rings k to the upright bars b of
35 the back frame.

While the bed is being folded up toward the position shown in Fig. 5 the slide-guides k slip down along the back frame-bars b and the holder K takes the position shown in that
40 figure. When the mattress is down the holder K is moved up and makes an ornamental closing for the open part of the back frame.

The canopy or curtains are suspended from a support at L having a main transverse part
45 l and carrying-arms l' , which are pivotally connected to the rear corner-uprights A A. By pivoting them in this manner they can be readily turned over when the bed is packed for transportation; but when the bed is in
50 use this curtain-holder is supported and stayed by legs l^2 , which rest upon the arms c' of the frame. I secure rigidly to this curtain-holder rosette-like stops l^3 at the rear corners, which prevent the rings l^4 that support the
55 curtains from slipping beyond the corners, which, as is well known, is a source of great annoyance. At the center I place a stop l^5 for a similar purpose, to limit the inward movement of the rings.

In order to insure sufficient stiffness and strength in that part of the tube C which carries the weight of the mattress-frame I insert therein a rod M prior to subjecting the tube to the bending or swaging action. Thereafter
60 the rod occupies the position shown in Fig. 6, it filling the supporting-arm c^2 and extending into the vertical parts c and c^3 sufficiently

far to insure sufficient rigidity and strength at the bends in the tube.

In order to prevent the bed from acciden- 70
tally swinging toward the folded position I employ a lock or stop, as at N. As shown, it comprises a bent bar having an arm n and two end parts n' , which are pivoted on the cross-bar B^2 of the back frame. By examin- 75
ing Fig. 1 it will be seen that the bar n of this lock can lie under the inner side of the mattress-frame and prevent it from moving downward. When it is desired to fold the bed up, the lock is thrown back by draw- 80
ing on the cord or equivalent N', which extends to the front side of the bed, such draft thereon releasing the bed from the lock and permitting it to be moved upward.

In order to hold the above-described lock 85
N in its normal position use may be made of a spring, as at N^2 in Fig. 4, and to prevent it from moving too far a stop N^3 can be employed. When the cord N' is pulled the lock N moves away from the stop N^3 against the 90
tension of spring N^2 .

I' is a tube or pipe placed around the stop and stay-rod I to strengthen it and give a symmetrical appearance to the end of the frame. 95

P is a mantle shelf and cover. It is placed at the top of the bed and may be secured in any suitable way. As shown, it is clamped in place below the ornamental balls or top pieces on the rear corner-legs A. Preferably 100
it is formed of sheet metal, which is japanned or colored so as to be ornamental in appearance, and has an upwardly-turning flange at p at the rear, and a downwardly-turning flange at p' at the front which comes outside 105
of the front bar l of the canopy-support L. As shown in Figs. 3, 5, and 9, it is made in two parts hinged together, so that one of them can be folded back, as shown in Fig. 5, when the bed is to be packed. This part P serves 110
not only as a support for books and other articles as are commonly placed on a mantel, but also serves to cover up or close the opening at the upper end of the bed to prevent the access of dust and other foreign material 115
during the time that the bed is folded up.

I have above described my improvements as applied to a side-folder; but it will be understood that many of them are just as applicable to end-folding beds. In Figs. 16 and 120
17 such a construction is illustrated. In such case there will not, ordinarily, be any necessity for the positive lock N above described, as so much of the weight is outside of the pivotal line; but the features above set forth can 125
be embodied which pertain to making and relating the parts so that they can be compactly arranged for transportation and can be held strongly in proper place when the bed is set up for use. 130

I am aware of course of the fact that folding beds having tubular frames have been heretofore made or proposed in several forms. I have myself constructed and patented such

articles. In my earlier patent, No. 444,064, dated January 5, 1891, a structure of this general class is illustrated; but in my said earlier bed there were marked differences in comparison with the present construction in the devices and method for supporting, manipulating, and fastening the parts. In that earlier bed the mattress-frame was connected to the stationary frame by three links, the two at the rear end of the mattress-frame being so related that when the mattress was down the links had one position relative to each other, and when the mattress was folded up they were both swung into new positions and then had such relation to each other that the longer or outer link and its pivot were outside of the center of gravity of the mattress and mattress-frame and effected the locking of the latter in their upright position. While under some circumstances that construction had advantages, I have found it desirable for many purposes to provide a simpler and cheaper construction, which shall be strong and durable and yet possess the least possible number of parts. In the present case the mattress-frame is supported upon a fixed pivot, and its weight is taken entirely by the lower part of the forward-projecting end frames instead of being distributed over the entire back frame from the upper to the lower end. Then in order to strengthen and brace the lower part of the end frames which must carry all the load, and must receive all the strain of the locking device, (which strain is severe because of the downward pressure caused by forcing the pivot j' beyond the line of the pivots j^2 and j ,) I construct these end frames in the way and provide them with bracing and strengthening devices of the sort shown. Nor do I claim broadly a toggle-lock, as I am also aware that a holding mechanism embodying that principle has been used in many ways; but I believe myself to be the first to have provided a metallic tubular framework for a folding bed of the character herein shown and to have supported the swinging mattress-frame thereon on a fixed axis, together with legs and leg-links so arranged in relation to each other, to the said fixed axis, and to the frame that the pivots of the legs and links can be so arranged as to lock the mattress in the upright position and at the same time prevent the severe strain from injuring the lower part of the frame.

What I claim is—

1. A folding bed having the rear tubular corner-uprights A, the back frame-bars rigidly secured thereto, the forward projecting tubular frame-bars C C, the hinge-eyes or swivel-joints c^4 loosely surrounding the rear tubes A and rigidly secured to the tubes C, said tubes C being bent to form the vertical parts c and c^3 and the horizontal parts c' c^2 , the locking-brace D having arms detachably secured to each of the four tubular legs, and the mattress-frame detachably pivoted di-

rectly to the horizontal parts c^2 of the frame-tubes C, substantially as set forth.

2. In a folding bed, the combination with the rear corner-uprights, the back frame-bars secured thereto, the forward-extending side frames formed of tubes C C each bent to have the vertical parts c c^3 and the horizontal part c^2 , of the metallic strengthening-rods M inserted respectively into the said tubes and bent therewith each rod extending from the vertical part c^3 through the horizontal part c^2 and into the vertical part c , the swinging mattress-frame, and the hinge devices for the mattress-frame secured to the horizontal tubes c^2 and to said rods M, substantially as set forth.

3. The combination of the rear corner-uprights formed of hollow tubing, the side frames hinged to the said uprights and formed of tubes each bent to have the front vertical tubular leg c^3 , the mattress-frame hinged directly to said tubing of the side frames, the detachable caster-wheels having their pintles inserted into said tubing, and the locking-brace D having bars each surrounding the axis of one of the said caster-pintles and detachable from the tubular leg, substantially as set forth.

4. The combination of the rear corner-uprights formed of hollow tubing, the side frames formed of tubes each bent to have the front tubular leg c^3 , the mattress-frame hinged to the side frames, the detachable caster-wheels having their pintles inserted into said tubing, and the locking-brace D having its members provided with passages for the said caster-pintles, whereby said brace is clamped between the lower ends of the legs and the body of the caster-wheels, substantially as set forth.

5. The combination of the rear tubular uprights A, the frame-bars secured thereto, the forwardly-projecting side frames each formed of a tube C bent to form the vertical parts c c^3 and the horizontal part c^2 , the mattress-frame, the laterally-projecting hinge arm or bar g' , and the hinge-eye secured directly to the horizontal tubing c^2 , substantially as set forth.

6. The combination of the rear corner tubular uprights, the side frames formed of bent tubes, the rotary collars or eyes connecting the said side-frame tubes with the back tubular uprights, the swinging mattress-support, the fixed collars or couplings secured to the rear corner-uprights, and the canopy-supporting rod l bent to have its ends pivoted in the said fixed couplings and provided with the rests l^2 for engaging with the side frames, substantially as set forth.

7. In a folding metallic bed, the combination of the tubular back frame extending to points above the mattress-frame when folded, the swinging mattress-frame, the tubular end frames secured to the tubular back frame, each end frame having a tube bent to form

the leg c^3 and a horizontal bar c^2 secured to the tubular back frame, a supplemental separately-formed horizontal bar joining the lower part of the tubular leg c^3 to the back
5 frame, a fixed pivot connecting the mattress-frame to each end frame around which pivot it swings on a fixed axis, a bar or frame joining and bracing together the front tubular legs c^3 , the legs J, the links J' pivotally connected to the legs J and to the front frame-
10 legs c^3 , at points above the brace or frame

which joins the legs c^3 to each other, and the pivot j' being arranged to pass the line of the pivots j and j^2 when the mattress is folded, substantially as set forth. 15

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

JOHN D. ENNES.

Witnesses:

W. B. BARTON,
L. M. STURGIS.