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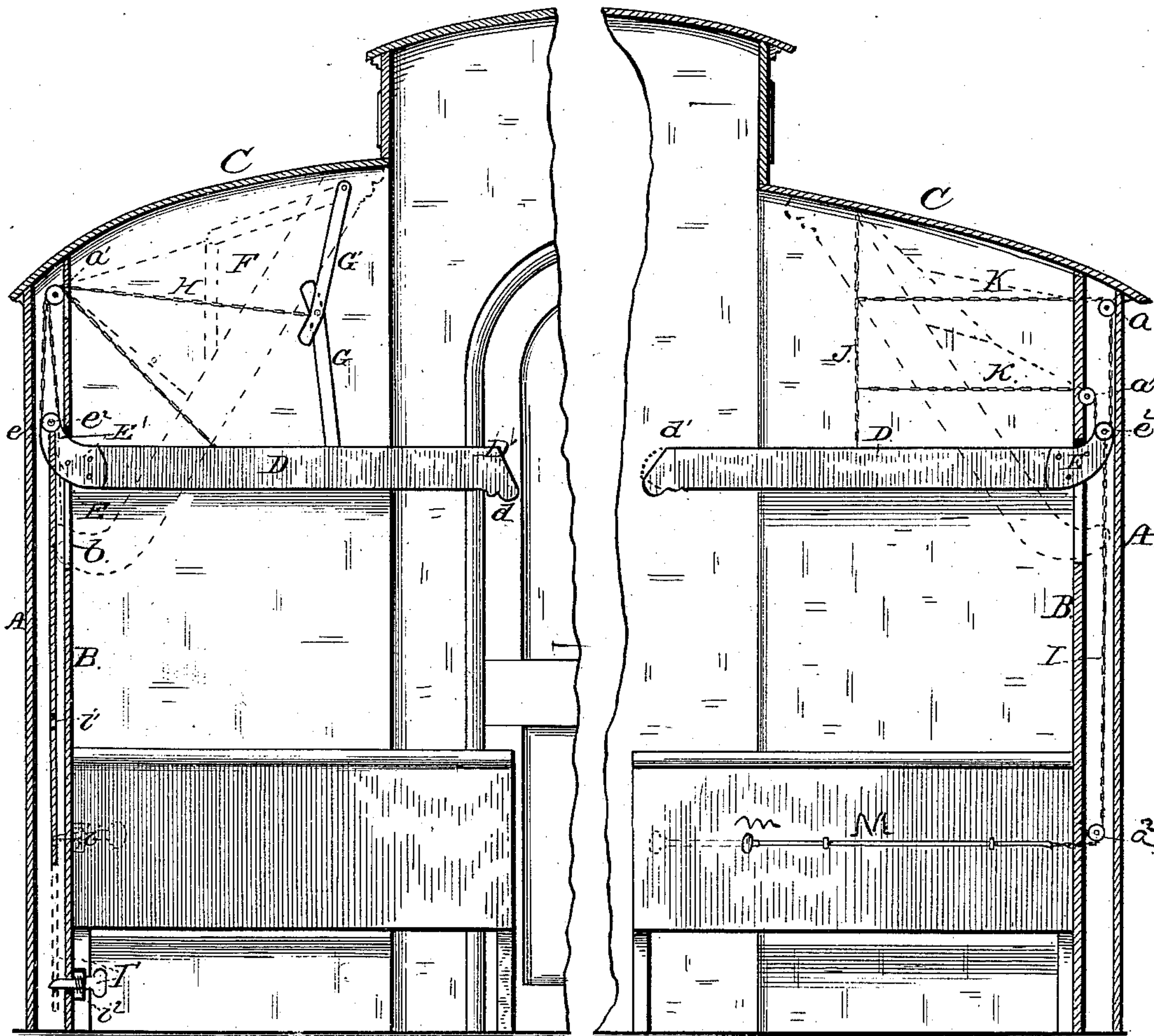
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H. S. HALE.  
FOLDING BERTH.

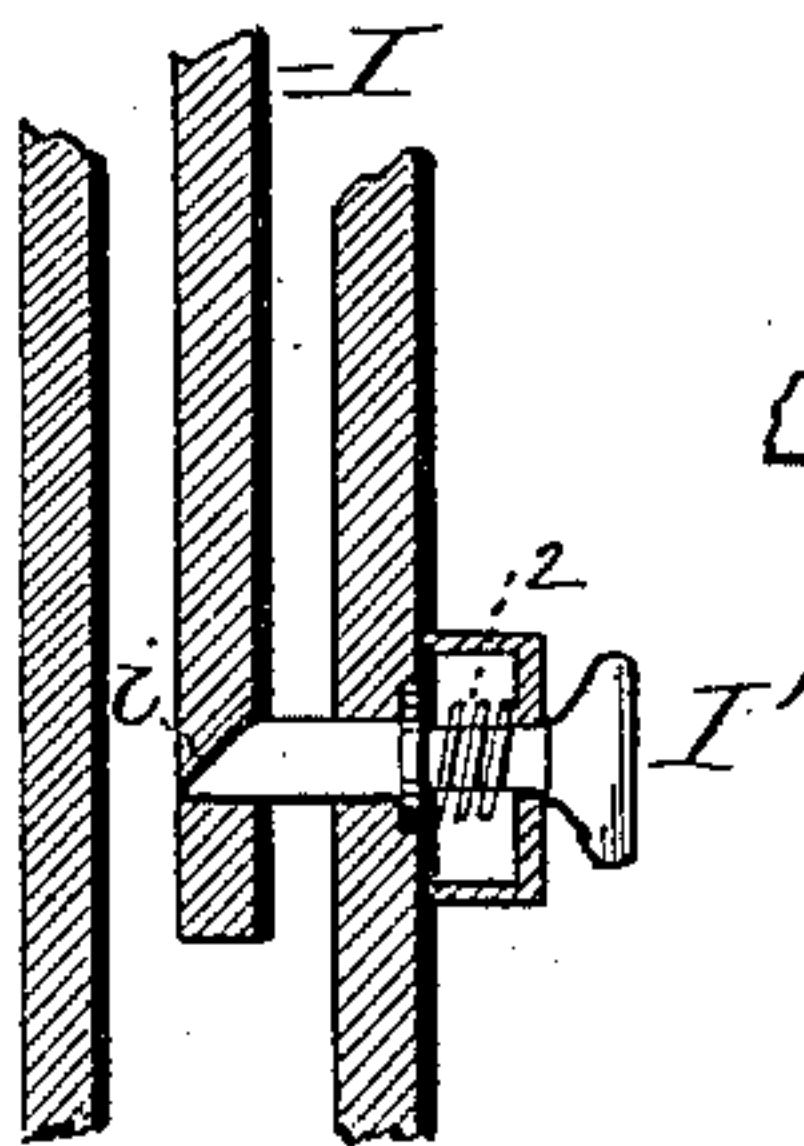
No. 297,256.

Patented Apr. 22, 1884.

*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



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*H. B. Burke*

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(No Model.)

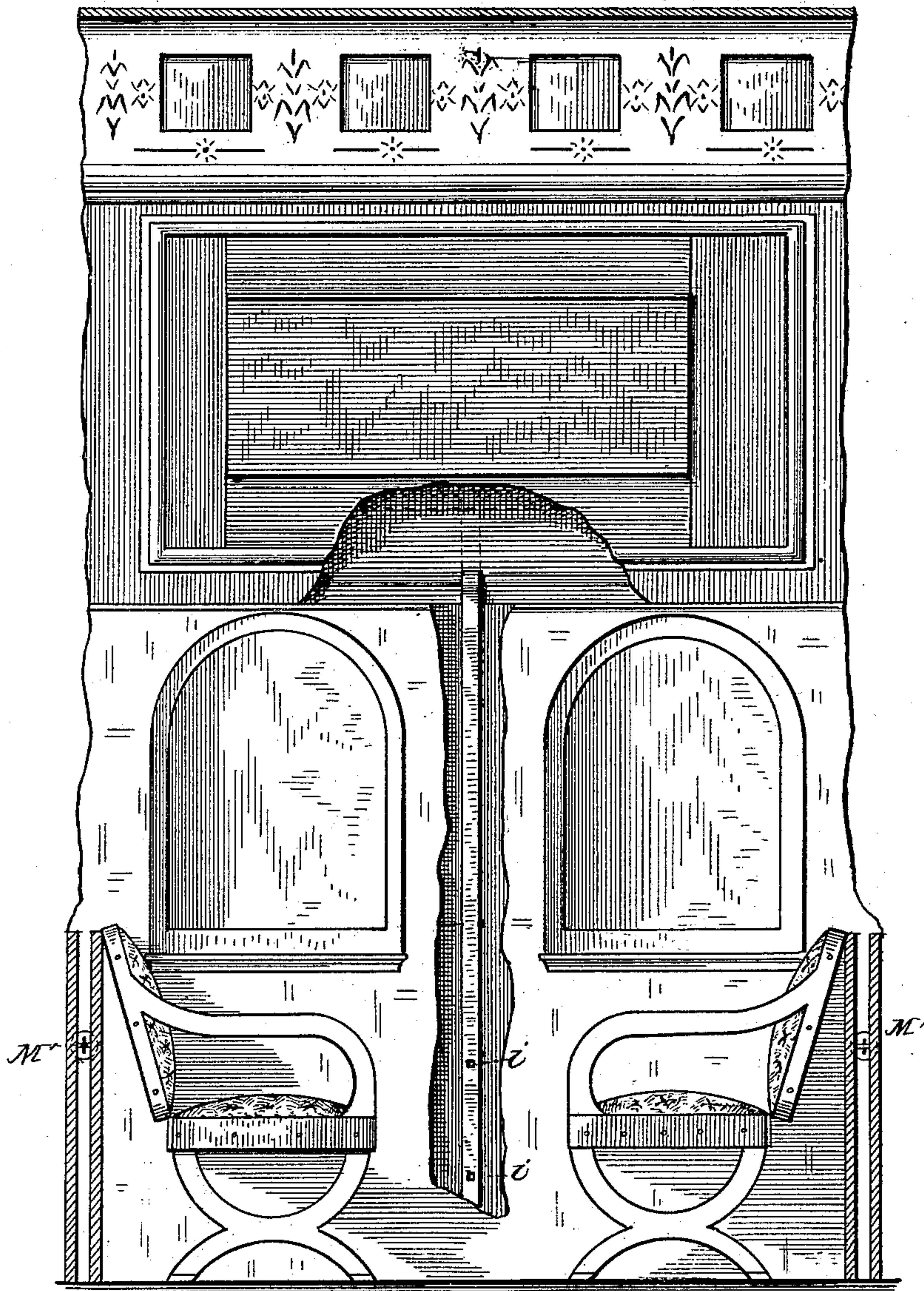
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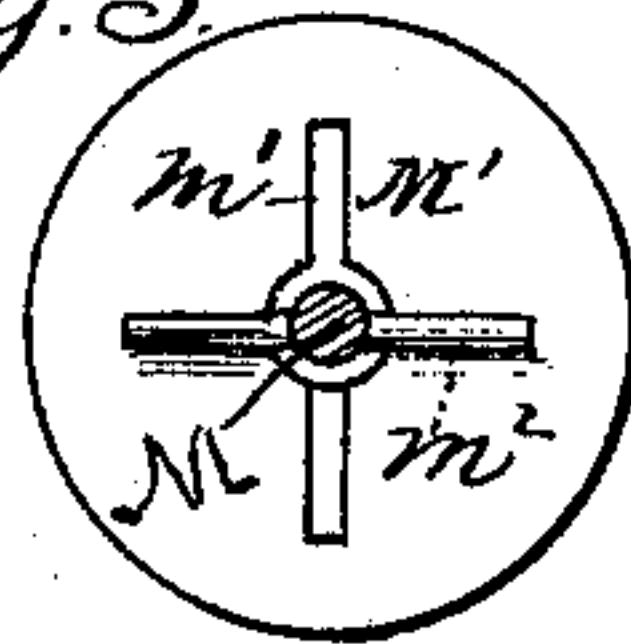
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*Fig. 8.*



*Fig. 3.*



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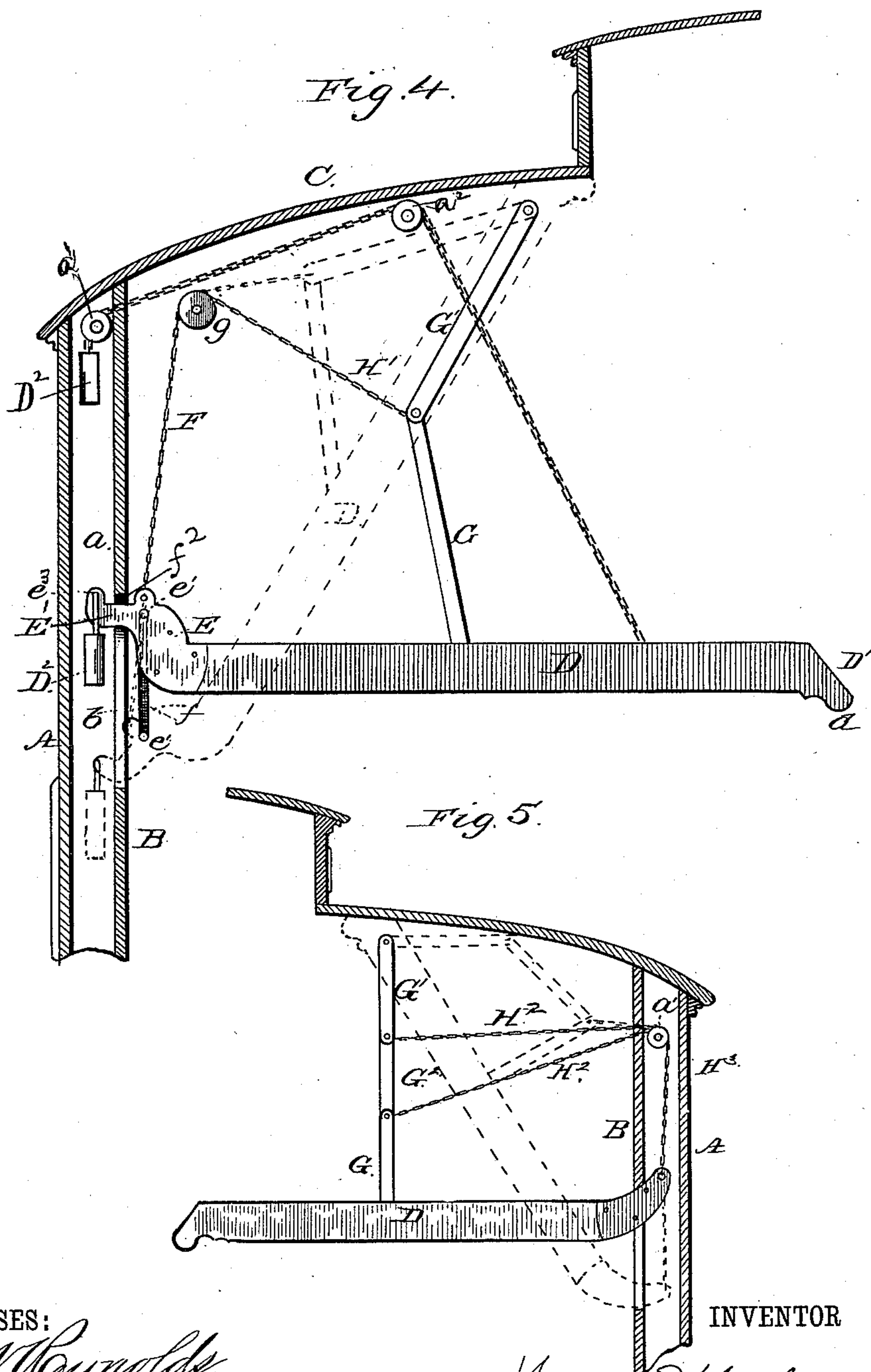
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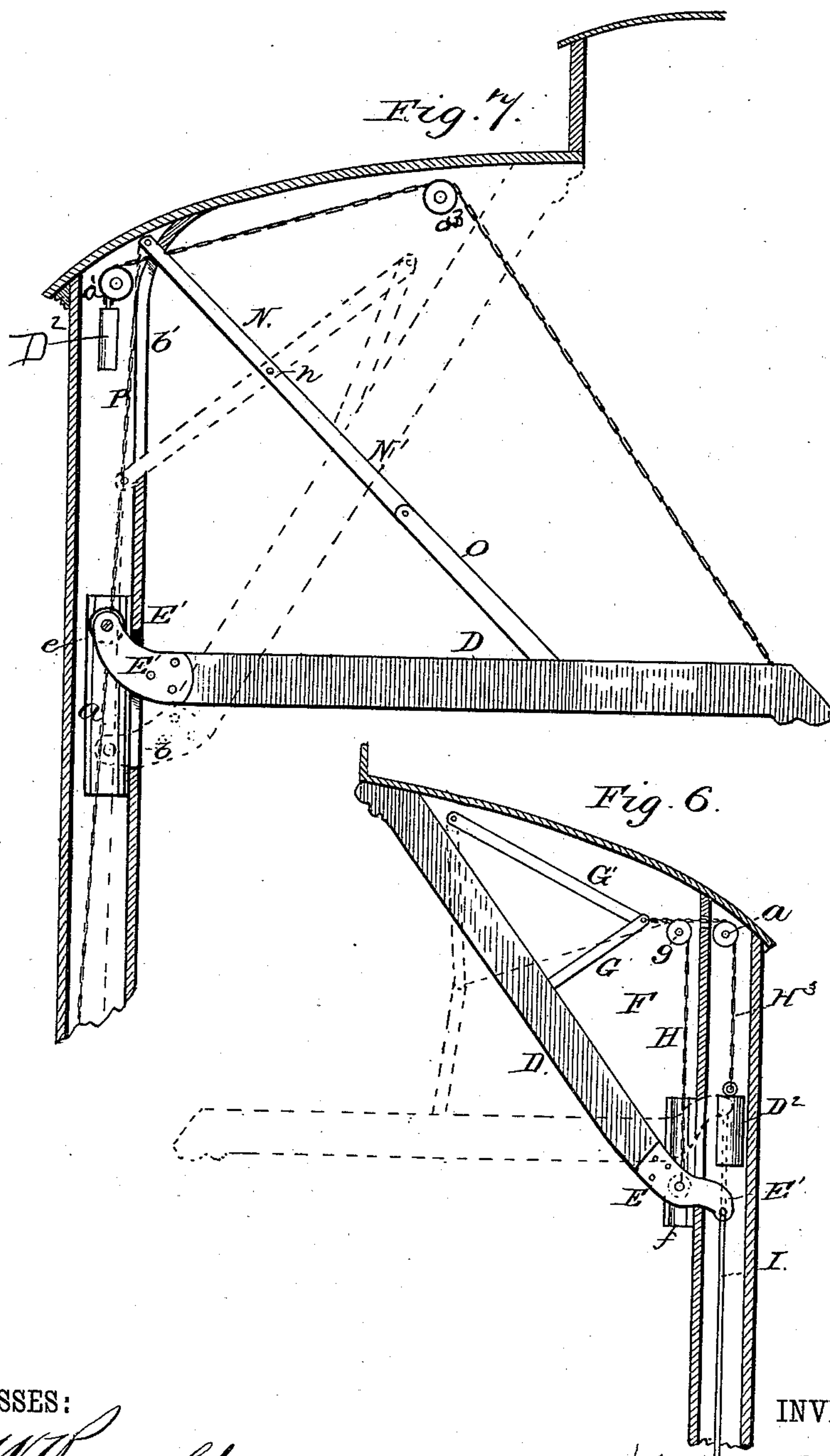
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# UNITED STATES PATENT OFFICE.

HENRY S. HALE, OF PHILADELPHIA, PENNSYLVANIA.

## FOLDING BERTH.

SPECIFICATION forming part of Letters Patent No. 297,256, dated April 22, 1884.

Application filed February 9, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY S. HALE, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Folding Berths, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is a transverse vertical section of a sleeping-car containing my invention, the central portion being broken away. Figs. 2 and 3 are details enlarged. Fig. 4 is a partial vertical transverse section, showing a modification. Figs. 5, 6, and 7 are partial vertical sections, showing other modifications. Fig. 8 is a partial longitudinal vertical section.

The object of my invention is to construct a sleeping-car berth and its supports in such manner as to facilitate the folding up and letting down of the same by means of such a construction and arrangement of parts as shall make the front and rear edges of the berth counterbalance each other upon its pivotal supports.

To this end one part of the invention consists, essentially, in connecting the rear or inner edge of the berth with its pivotal supports by means of a chain running over a pulley above the berth, one end of the chain being attached to the said inner edge of the berth, its opposite end being attached to the pivotal supports.

Referring particularly to the left-hand portion of Fig. 1, A is the outer wall of the car; B, its inner wall, arranged at some distance from the outer wall, and C the roof or deck of the car.

D is the end rail of the berth, there being, of course, a similar end rail at its opposite end, with suitable longitudinal rails and a bottom, which may be of substantially the character commonly employed in sleeping-car berths.

At the inner end of each rail D there is a heel-extension, EE', preferably of metal, which projecting through a vertical slot, b, in the inner wall of the car and carrying an anti-friction wheel at e, which is mounted upon a stud projecting laterally from the heel-extension, engages with the vertical walls of a slot or

track formed for its reception, whereby the heel-extensions are prevented from moving inward through the inner walls, B, of the car. The inner ends of the end rails are beveled, as indicated at D', so as to abut closely against the lower face of the deck or roof of the car, thus obviating the necessity for the longitudinal downwardly-projecting strip which is commonly employed at this point, in order to present a finished appearance of the car, which strips, however, are objectionable. When preferred, however, the inner ends of these rails and the outer edge of the berth may be rounded, as indicated in dotted lines d' of the right-hand portion of Fig. 1, and a bead or molding, d, may be added for the purpose of ornamentation.

F is the permanent portion of the head-board or partition between the ends of the berths.

G G' is a jointed link, pivoted at its upper end to the partition F and at its lower end to the end rail, D.

H H is a chain connected at one end to the jointed link at about its center, and at its other end to the end rail, D, the doubled portion of the chain passing over a pulley, a', and thence round a pulley or sheave, e', attached to the heel-extension E E'.

By an examination of the left-hand portion of Fig. 1 it will be readily understood that as the berth is folded up from the horizontal position shown in full lines to the inclined position shown in dotted lines its inner side or edge moves downward and is supported by the doubled end of the chain; and it will be found in practice that very little power is required to move the berth up and down, by reason of this counterbalancing arrangement of chains and links. It will of course be understood that the berth, when let down, is supported both by the jointed link G G', and also by the chain H H.

I is a locking-bar arranged between the inner and outer walls of a car. It is connected at its upper end to the inner end of the heel-extension, and is provided near its lower end with slots i i'.

I' is a locking-latch supported in the side of the car, and thrust inward by means of a spiral spring, i', so that when the berth is folded up the latch-bar enters the slot i and holds the



berth firmly in position. So, also, when the berth is let down for occupancy, the latch enters another slot,  $i^2$ , in the bar I and holds the berth firmly in its horizontal position. As indicated in Fig. 1, this latch-bar is connected directly to the heel-extension of the end rail, so that the spring-latch can be arranged within that portion of the seat which is occupied by the cushions, when the cushions are in the position indicated in Fig. 8; and, when desirable, the inner ends of the vertical cushions may be cut away to receive the projecting end of the latch. By preference I employ two of these vertical bars, one at each end of the berth.

As indicated in Fig. 8, one vertical bar is employed at about the center of the berth, its upper end being connected to a longitudinal rod, I', which is supported at its ends in the heel-extensions, the vertical bar running down between the windows of the car, in which case the locking-latch is arranged between the two adjacent seats, and preferably near the lower line of the windows.

In the right-hand portion of Fig. 1 I have shown a chain, J, instead of the jointed link G G', and in this instance a chain, K K, is connected at its ends to the chain J, running thence over pulleys  $a'$   $a'$ , the lower doubled end of the chain passing round a pulley,  $e$ , on the inner end of the heel-extension.

L, in same figure, is a chain connected at its upper end to either the chain K or to the inner end of the heel-extension; thence down round a pulley,  $a^2$ ; thence horizontally to the end of a draw rod or link M, which is arranged between the backs of two adjacent seats.

$m$  is a knob on the upper end of draw-rod M, which the operator can take hold of to pull upon the chain L, in order to assist in turning up the berth.

M' (see Fig. 3) is a locking-plate provided with a central slot,  $m'$ , through which a pin,  $m^2$ , attached to the draw-rod, and at right angles thereto, can pass, when turned in the proper position, the relation of these parts being such that after the operator has pulled the pin  $m^2$  through the slot  $m'$ , just at the time the berth reaches the limit of its upward movement, he can then twist the draw rod so as to turn the pin crosswise of the slot  $m'$ , and thus lock the berth securely in its uppermost position.

In Fig. 4 the heel-extension E' carries at  $e'$  an anti-friction roller, which traverses a vertical slot,  $f$ , in the vertical partition F, and a chain, H', is connected at one end to the jointed link G G', passes thence over a pulley,  $g$ , supported on the permanent head-board or partition, thence down to the heel-extension, to which it is attached, the chain thus serving to support the inner edge of the berth, and assist in counterbalancing it. When preferred, however, the heel-extension may be continued through the slot  $b$ , and have a weight, D<sup>2</sup>, attached to the inner end, E', of the heel-extension. When this extension and weight are

used, an anti-friction roller at  $e'$  may be attached to the part E', and travel in a slot formed for its reception in a vertical standard arranged between the inner and outer walls of the car, in which case the slot  $f$  and anti-friction roller  $e'$  may be omitted.

In Fig. 5 I have shown another modification, in which the jointed supporting-link is made in three parts, G G' G<sup>2</sup>, and in this instance two chains, H<sup>2</sup> H<sup>2</sup>, may be each attached at one end to the jointed link, and at the opposite end to a third chain, H<sup>3</sup>, the lower end of which is connected to the heel-extension for the purpose of counterbalancing the berth; but I do not wish to be limited to the employment of the two chains H<sup>2</sup> H<sup>2</sup>, because one of them might be omitted, in which latter case I would prefer to attach the single chain to the part G<sup>2</sup> of the link at about its center—that is to say, about midway between the pivoted ends of said part G<sup>2</sup>.

In Fig. 6 I have shown another modification, in which the parts are substantially the same as those above described, and shown in Fig. 4, except that I propose to employ a weight, D<sup>2</sup>, connected by chain H<sup>3</sup> to the jointed link; and in this instance I propose to use a locking-bar, I, to be attached at its upper end to the inner end of the heel-extension, and provided at its lower part with slots to receive a locking-latch, substantially as has been referred to.

In Fig. 7 I have shown another modification, in which the upper part, N N', of the jointed link is pivoted about midway its length—say at  $n$ —to the partition F, the lower part, O, of the link being pivoted to the upper link and to the end rail, D. The upper part, N, of the link traverses a slot,  $b'$ , in the inner wall of the car, and P is a chain attached to that end of the pivoted link and extending downward, where it passes round a pulley to a draw-rod, substantially like the draw-rod M, which has been described. Of course, the draw-rod may be provided with locking devices for the purpose of holding the berth in its position when swung upward.

In the working of my invention, the pull in an upward direction of the pivot which connects the lower end of the jointed link to the berth is effected by pulling the central part of said link toward the vertical plane of the inner edge of the berth—that is to say, toward the side of the car; hence it will be understood that with a uniform weight or pull upon the inner end of the counterbalancing-chain the actual lift upon the pivot at the lower end of the link is greatest when the berth commences to move from its horizontal position upward, that being the time when the greatest amount of power is required to overcome the inertia and lift the weight of the berth.

I do not wish to be limited to the precise construction and arrangement of parts herein shown, because many modifications might be made, particularly in the relative lengths and pivoting-points of the links and the lengths



and points of attachment and support of the chains without departing from the spirit of my invention; but I have shown such as I believe to be best now known to me for the working of my invention, and such as will under ordinary circumstances secure satisfactory results. Neither do I wish to be limited to the employment of my invention in connection with a sleeping-car, because it is equally well adapted for the hanging and support of berths in steamboats, bed-rooms, and other places where folding berths may be found desirable. Nor do I wish to be limited to the use of my invention in connection with a berth in which its inner edge rises and falls, because under many circumstances it will be found advisable to use the chain and weight or chain and draw-rod in connection with berths which are hinged at their inner edges directly to a vertical wall, for the purpose of assisting in counterbalancing.

On another modification I propose to employ the jointed link  $G G'$  and cord connecting the link with the inner edge of the berth, and running over a pulley at  $a'$ , in combination with a supplemental lifting-cord attached at one end to the berth near its front end, and at its other end to a fusee and spring, substantially as is commonly done in sleeping-cars; or the cord may run over a pulley or pulleys (see Fig. 4) or two pulleys,  $a' a''$ , (see Fig. 7,) and have a weight,  $D^2$ , attached.

I also propose to construct the inner end of each link with a projecting shoulder or stop,  $g^2$ , under such an arrangement of parts that these stops shall each engage with the edge of the opposing member of the jointed link and prevent them from being straightened out, (see Figs. 1 and 9,) so that this construction relieves the chain from further pull outward after the berth reaches a horizontal position.

I also propose to use stops or shoulders  $f^2$ —one at each end of the berth—against which the inner end of the rails strike and abut when the berth is let down.

In all of the constructions shown an upward pull or lift upon the berth is exerted through the medium of the jointed link, and in each and every construction this lifting is effected by moving the central or substantially central portion of the link away from a line which intersects the pivots by means of which the jointed link is connected to the end of the berth and to the partitions between the ends of the berths.

What I claim is—

1. The combination, with a folding berth, of a jointed supporting-link pivoted at its lower end to the berth, a support for the upper end of the link, a chain connected at one end to the jointed link, and means for pulling the chain toward the vertical plane of the inner edge of the berth, substantially as set forth.

2. The combination, with a folding berth, of a jointed link pivoted at its lower end to the berth, a support for the upper end of the

link, and means for moving the central part of the link toward the vertical plane of the inner edge of the berth, substantially as set forth.

3. The combination, with a folding berth, of a jointed link pivoted at its lower end to the berth, means for supporting the upper end of the jointed link; means for supporting the inner edge of the berth, and permitting it to rise and fall, and means for moving the central part of the jointed link toward the vertical plane of the inner edge of the berth, substantially as set forth.

4. The combination, with a folding berth, of a jointed link attached at its lower end to the berth, a support for the upper end of the link, a support for the inner edge of the berth which permits it to rise and fall, a chain connected at one end to the jointed link and at its opposite end to the inner edge of the berth, and a pulley for supporting the chain between its ends, substantially as set forth.

5. The combination, with a folding berth, of a jointed link connected at its lower end to the berth, a support for the upper end of the link, a support for the inner edge of the berth, a chain connected at one end to the jointed link and at its opposite end to a weight, and a pulley for supporting the chain between its ends, substantially as set forth.

6. The combination, with a folding berth, of a jointed link connected at its lower end to the berth, a support for the upper end of the link, a chain connected at one end to the jointed link and at its opposite end to the inner edge of the berth, a pulley for supporting the chain between its ends, a rising and falling weight, and a chain connecting the weight with the jointed link, substantially as set forth.

7. The combination, with a folding berth, of a jointed link, a chain connected at one end to the berth, at its opposite end to the jointed link, and at its doubled end to the inner edge of the berth, and a pulley for supporting the chain between its doubled ends and its ends which are attached to the jointed link and berth, substantially as set forth.

8. The combination, with a folding berth, of a jointed link pivoted at its lower end to the berth, means for supporting the upper end of the jointed link, means for supporting the inner edge of the berth, and means for moving the central portion of the jointed link away from a line which intersects the pivot at the lower end of the link and the point at which the link is attached to the partition at the end of the berth, substantially as set forth.

9. The combination, with a folding berth, of a pivotal support between its outer and inner edges, the vertical link  $I$ , connected with the inner edge of the berth, and devices for locking the vertical link in position to hold the berth in its inclined position, substantially as set forth.

10. The combination, with a folding berth having end rails projecting through the inner



wall of the car, of a pivotal support between the outer and inner edges of the berth, and a locking mechanism connected to the end of a side rail between the inner and outer walls of the car, for locking the berth in a horizontal position, substantially as set forth.

11. The combination, with a folding berth having end rails projecting through the inner wall of the car, of a pivotal support between the outer and inner edges of the berth, a longitudinal rod supported at its end in the end rails, between the outer and inner walls of the car, a vertical bar, I, connected to the longitudinal rod, and the locking-latch I', substantially as set forth.

12. The combination, with a folding berth, of a pivotal support between its outer and

inner edges, and a locking mechanism connected with its inner edge to lock the berth in a horizontal position, substantially as set forth.

13. The combination, with a folding berth, of pivotal supports between its outer and inner edges, and a locking mechanism connected with its inner edge and adapted to lock the berth in a horizontal position, and also in an inclined position, substantially as set forth.

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

HENRY S. HALE.

Witnesses:

JNO. B. KILBURN,  
OWEN D. ROBERTS.