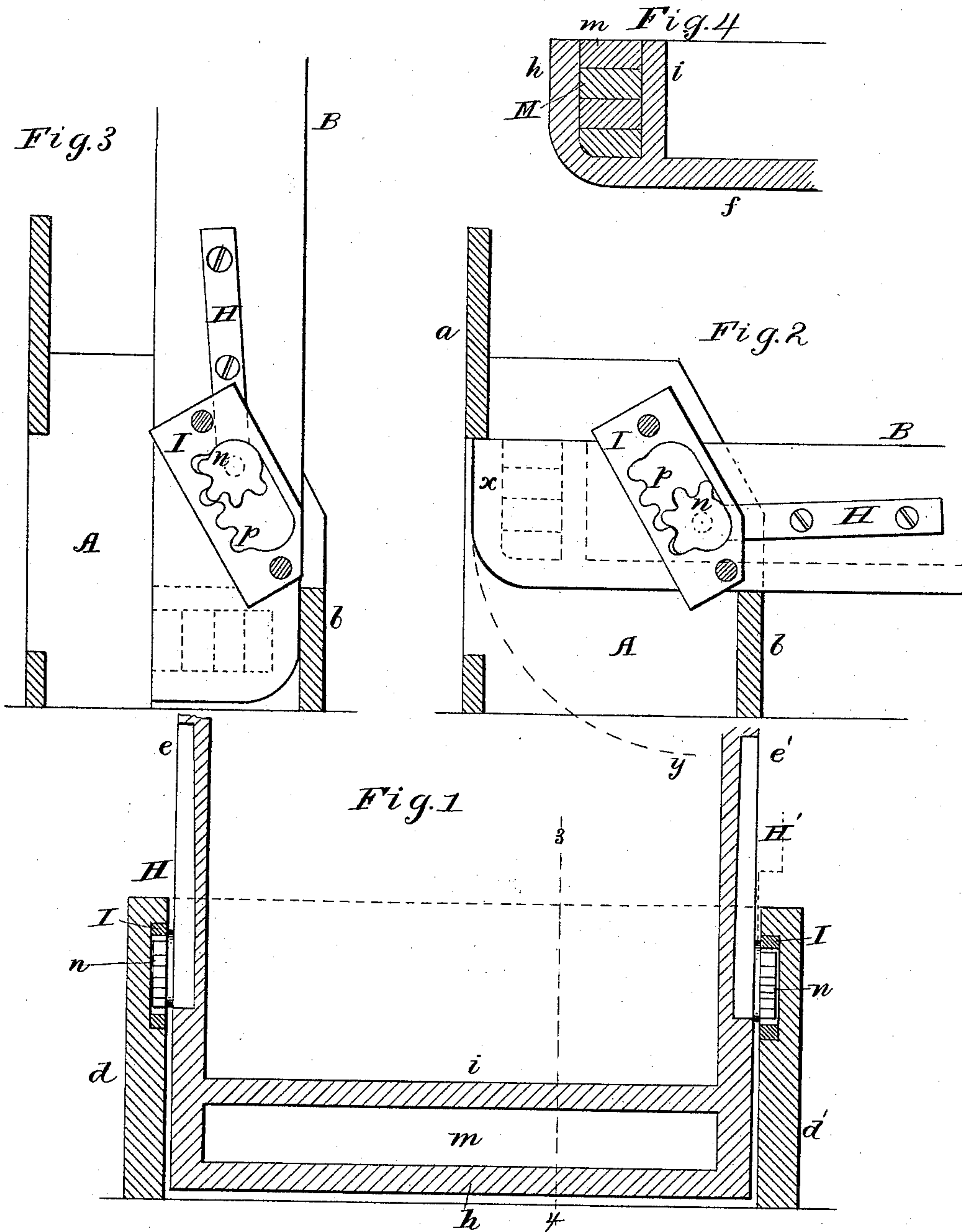


H. S. HALE.
FOLDING BEDSTEAD.

No. 409,606.

Patented Aug. 20, 1889.



Witnesses

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HENRY S. HALE, OF PHILADELPHIA, PENNSYLVANIA.

FOLDING BEDSTEAD.

SPECIFICATION forming part of Letters Patent No. 409,606, dated August 20, 1889.

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To all whom it may concern:

Be it known that I, HENRY S. HALE, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented an Improvement in Folding Bedsteads, of which the following is a specification.

My invention relates to that class of bedsteads which have a stationary supporting-frame resting upon the floor and a folding or swinging frame connected thereto by means of interposed fulcra in such manner that the folding member or frame can be placed in a substantially horizontal position, and can also be folded up into a substantially vertical position; and one part of the invention relates to the combination, with frames of that character, of a series of fulcra rigidly attached to one member, and a series of fulcra-seats attached to the other member under such an arrangement of parts that the fulcra engage successively with the seats when the folding frame is being moved from one position to the other.

Another part of the invention relates to the arrangement of the pivotal supports or connections in such manner that the movable frame will not slam against the upright portion of what is known as the "wardrobe-bed" when it is being folded up or closed, this result being accomplished by arranging the pivots so that when the movable frame is approaching a vertical position it shall swing upon fulcra or pivots which are nearer the rear wall or back of the bed than are the fulcra or pivots upon which it is supported when the swinging frame is in a horizontal position.

Another part of the invention relates to so arranging the pivotal support that when the swinging portion is in the vertical position it shall be supported upon fulcra or pivots which are higher than the fulcra or pivots upon which it is supported when it is in a horizontal position.

Another part of the invention relates, broadly, to connecting the movable part with its supporting part which rests upon the floor by means of cogged racks, whereby the swinging part is supported upon movable fulcra in such manner that the pivoting points vary in their distances from the rear wall or back of

the bed as it is being folded or let down for use.

In the accompanying drawings, Figure 1 is a sectional plan of sufficient of a folding bedstead to illustrate my improvement; Fig. 2, a vertical section on the line 1 2, showing the folding part of the bedstead depressed; Fig. 3, the same as Fig. 2, but showing the folding part elevated, and Fig. 4 is a vertical section on the line 3 4.

A is a fixed or permanent frame of the bedstead, *a* being the rear, *b* the front, and *d d'* the opposite sides, of the said frame.

B is the movable frame, composed of the opposite side rails *e e'* and the bottom *f, m* being a receptacle for containing the counterbalance-weight M, the said receptacle being formed in the present instance by two cross-bars *h* and *i*. The weight, however, may be attached to the movable frame in any manner which may be found the most convenient; but in all cases they should be placed as near as possible to the rear end of the movable frame, so that a comparatively light weight may be available, through a leverage, to counterbalance the movable frame. Into each of the said rails *e e'* of the movable frame is let and secured a bar H, having at the end a fixed pinion *n*, which may have the limited number of teeth shown, these teeth being adapted to those of an inclined rack *p* on the plate I. Thus there is provided two series of independent fulcra, one upon each side of the bed under such relation of parts that as the folding part of the bed is being either let down or folded up it is supported successively upon these fulcra. One of these plates is let into and secured to the face of each of the side pieces *d d'* of the fixed frame A, so that there may be one plate and rack for the pinion on one side of the movable frame and another plate and rack for the pinion on the other side of the said frame. It will be seen that each plate I is slotted, and that the pinion fits snugly in this slot, so that the movable frame will always be connected to the fixed frame. It will be seen that the swinging portion of the bed is in the nature of a lever of the first order—that is, having the weights situated at one end, the power at the

other, and the fulcrum between the two, and that as the swinging part of the bed changes its position the fulcrum about which it moves is changed. It will also be seen that although
 5 when the swinging frame is being folded up or let down it is supported upon a shifting fulcrum and seats therefor, yet the parts which constitute the series of fulera and fulera-seats are fixed in their positions relative to the
 10 parts of the frame to which they are respectively attached. When, therefore, I use the words "fulcrum" or "fulcra" and "fulera-seats," I refer to the supports by which the folding frame is connected with the stationary
 15 frame; and when I use the words "stationarily attached" I mean that the parts thus referred to are firmly connected with the parts which carry them, and are practically incapable of movement relatively there-
 20 to, although they may change their position relatively to the opposing member of the bed. When the movable frame is depressed, as shown in Fig. 2, the pinion will be at or near the lower end of the slot in the plate I; but
 25 when the frame has been elevated to a vertical position the pinion will be at the upper end of the slot in the said plate, as shown in Fig. 3; hence during the operation of turning up the movable frame it must be
 30 raised vertically by the operation of the cogged parts. The object of this is to obtain a long leverage for the counter-balance without raising the fixed frame to an undue height. This may be illustrated by reference to Fig. 2, and
 35 by supposing the movable frame to be hinged to the fixed frame at the point *n* by the usual fixed pivot-pin. On turning up the movable frame thus pivoted, the rear end *x* would move in the dotted arc *y* of a circle, and it would
 40 be necessary to make the fixed frame higher than is shown in the drawings, in order that the rear of the frame may clear the floor, whereas by the use of the pinions and racks in the manner described above the low frame
 45 shown in the drawings may be used. Another advantage of this mode of connecting the movable frame to the fixed frame is this, while an effort will be required to raise the movable or folding part of the bedstead, it
 50 will not fall back against the fixed frame with a jar which accompanies the upward movement of an ordinary pivoted frame, and which tends to injure the entire structure. Another advantage is the facility with which the mov-
 55 able frame can be turned down. It will also be seen from an examination of Fig. 3 that when the movable frame carrying the bedding is folded into the upright supporting-frame the counterbalancing-weight lies below
 60 the pivots upon which the movable frame is supported, part of the weight lying in front of and part in rear of the pivotal line, which arrangement insures that the movable frame shall be held steadily and properly balanced
 65 when folded up.

From the above description it will be seen that the rack and pinion form a toothed hing-

ing mechanism interposed between the swinging frame and its support which rests upon the floor, and that these toothed devices constitute a series of fulera or pivotal supports
 70 arranged in inclined positions extending forward, so that part of them are nearer the rear wall or back of the bed than others are, the arrangement of parts being such that as the
 75 bed is being let down or unfolded for use the commencement of such movement results in successively shifting its fulcrum or the points of its pivotal supports farther forward, where-
 80 by the leverage of the counterbalancing-weight is increased, and therefore made more effective in supporting the weight of the foot-board and the bedding, which is arranged or
 85 located between the points of pivotal support and the foot of the bed. It will also be seen that the spaces between the cogs or teeth constitute seats, which receive the upper ends
 90 of opposing cogs or teeth, which latter serve as fulera or pivots about which the folding frame vibrates, these seats and opposing teeth operating substantially to hinge the parts together.

I am aware that a number of prior patents show folding beds in which the folding or
 95 swinging sections and the stationary supporting-sections are connected with each other by movable pivots, one on either side of the bed, the construction and arrangement of parts being such that as the swinging part is being
 100 folded from a horizontal to a vertical position the pivots move toward the head-board, and also move upward; hence I do not herein claim such construction; but my invention differs radically from any prior construction,
 105 because it has upon each side of the bed a series of fulera, upon each pair of which the swinging portion is alternately supported.

I am also aware of Patent No. 159,682 for a hinge; but my invention differs in many es-
 110 sentials from that found in said last-mentioned patent. For instance, the door which is shown in that patent swings in a horizontal path with its upper and lower edges traversing horizontal parallel planes, while in my bed the
 115 side boards, to which the pinions are attached, swing in vertical planes, and the weight of the folding section is supported wholly upon the fulera, whereas in the hinge patent the weight of the door is supported almost wholly
 120 upon a flange which projects horizontally from one member of the hinge at the lower edge of the door and rests upon the flat upper sur-
 125 face of the other member of the hinge. Again, in the hinge patent the door neither rises nor falls when swinging, while in my bed the folding portion swings, when nearly folded up, about a pair of pivots which are very much
 130 higher than the pair of pivots about which it swings when let nearly down. Again, in the hinge patent the relation of parts is such that the pivots about which the door swings when nearly closed are at the same distance from the plane of the casing which surrounds the door as are the pivots about which the door

swings when wide open; but, on the other hand, in my bed the pivots about which the folding section swings when the bed is folded up occupy a plane a good way inside of the plane of the pair of pivots about which the folding section swings when let nearly down. These differences are indispensable features in the carrying out fully of my invention.

I am also aware that Patent No. 76,423, to Dutton, shows a stationary frame, a folding frame having upon either side a curved bearing and supporting surface engaging with a strap connected to the lower end of the curved surface and attached at its upper end to the stationary frame, the relation of parts being such that the lower ends of the straps swing inward and rearward and wrap around the curved surfaces when the folding part of the bed is let down for use; but in the Dutton bed, among other points of difference, the portions of the straps which are in contact with the curved surfaces and are described in the patent as constituting fulcra are not stationarily attached to either the folding frame or the supporting-frame, but shift their positions constantly as the bed is being folded up or let down.

What I claim is—

1. In a bed, the combination of a supporting-frame and a folding frame, of which one is provided upon each side with a series of independent fulcra and the other is provided upon each side with a series of stationary fulcra-seats, the fulcra and fulcra-seats being adapted to engage successively with each other, substantially as set forth.

2. In a bed, the combination of a supporting-frame and a folding frame, of which one is provided upon each side with a series of independent fulcra and the other is provided upon each side with a series of stationary fulcra-seats, the fulcra and fulcra-seats being adapted to engage successively with each other, and being arranged at different heights from the lower side of the bed, substantially as set forth.

3. In a bed, the combination of a supporting-frame and a folding frame, of which one is provided upon each side with a series of independent fulcra and the other is provided upon each side with a series of stationary fulcra-seats, the fulcra and fulcra-seats being adapted to engage successively with each other, the rearmost fulcra and fulcra-seats being higher than those at the front, whereby, when the bed is folded up, the swinging frame is lifted bodily, substantially as set forth.

4. In a bed, the combination of a supporting-frame and a folding frame, of which one is provided upon each side with a series of independent fulcra and the other is provided upon each side with a series of stationary fulcra-seats, the fulcra and fulcra-seats being adapted to engage successively with each

other, said fulcra and fulcra-seats being arranged at different distances from the rear of the bed, substantially as set forth.

5. In a bed, the combination of a supporting-frame and a folding frame, of which one is provided upon each side with a series of independent fulcra and the other is provided upon each side with a series of stationary fulcra-seats, the fulcra and fulcra-seats being adapted to engage successively with each other, said fulcra and fulcra-seats being so arranged as to support the folding frame upon those nearest the rear when the folded part is vertical, whereby, when the bed is folded up, the folding frame is moved rearwardly relatively to the supporting-frame, substantially as set forth.

6. In a bed, the combination of a supporting-frame and a folding frame, of which one is provided upon each side with a series of independent fulcra and the other is provided upon each side with a series of stationary fulcra-seats, the fulcra and fulcra-seats being adapted to engage successively with each other, the rearmost fulcra and fulcra-seats being higher than those at the front, the arrangement of parts being substantially as described, whereby, when the bed is folded up, the folding frame is moved bodily rearward and upward relatively to the supporting-frame, substantially as set forth.

7. In a bed, the combination of a supporting-frame and a folding frame, of which one is provided upon either side with a series of fulcra and the other is provided with a series of stationarily-attached fulcra-seats arranged on lines extending upward and backward, the folding frame, when horizontal, being supported upon the lower and forward fulcra and fulcra-seats, and being successively supported upon those above and in rear as it is folded up, substantially as set forth.

8. In a bed, the combination of a supporting-frame and a folding frame, the counterbalancing-weight attached to the inner end of the folding frame, and the fulcra upon opposite sides of the bed interposed between the folding frame and the supporting-frame and arranged substantially as described, whereby, when the folding frame is swung into a vertical position, the counterbalancing-weight lies below the fulcra and partly in front thereof, substantially as described.

9. In a bed, shifting fulcra consisting of two cogged racks, in combination with the upright frame and folding frame, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY S. HALE.

Witnesses:

JAMES F. TOBIN,
HARRY SMITH.