

No. 699,727.

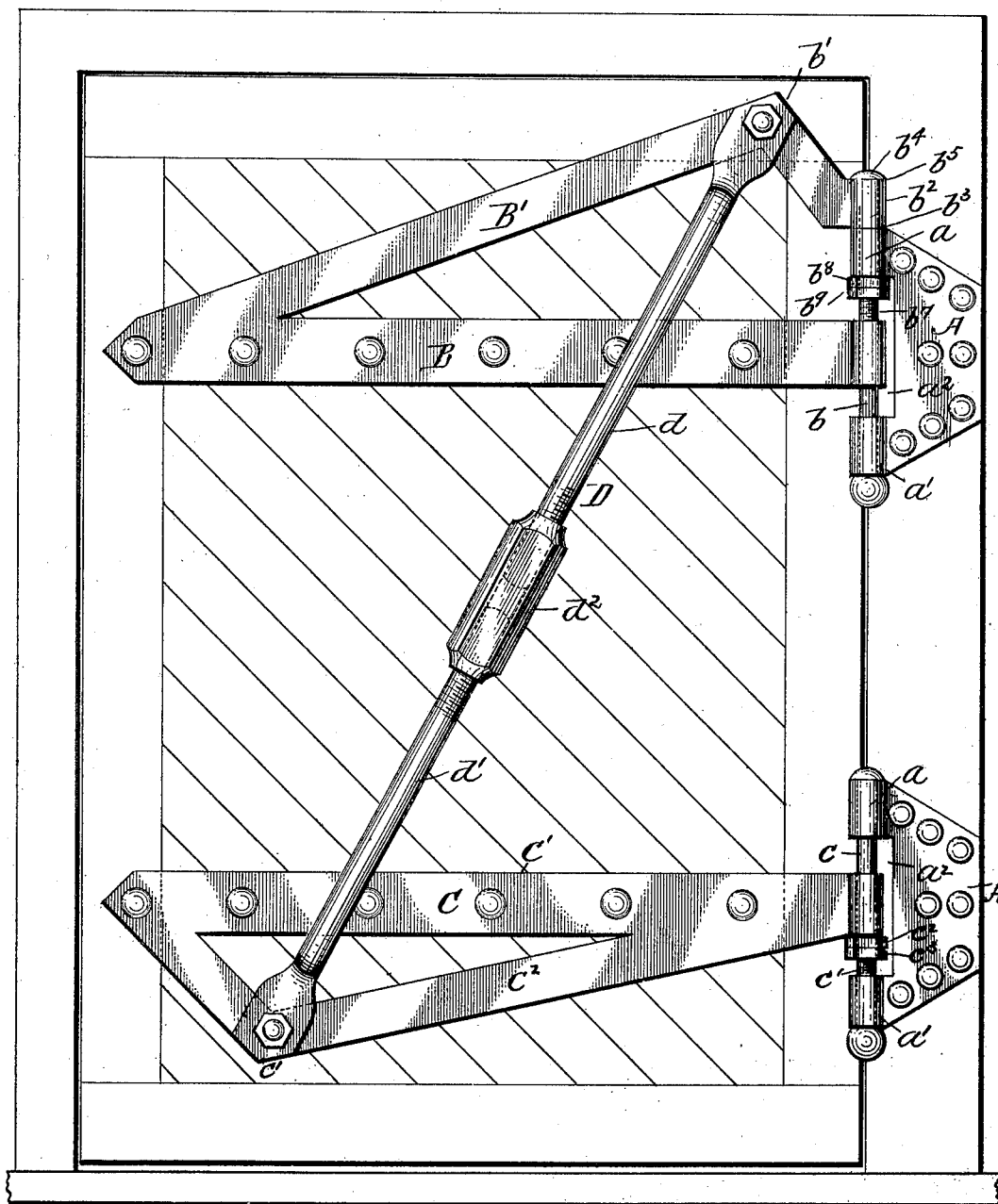
Patented May 13, 1902..

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HINGE.

(Application filed May 22, 1901.)

(No Model.)



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HINGE.

SPECIFICATION forming part of Letters Patent No. 699,727, dated May 13, 1902.

Application filed May 22, 1901. Serial No. 61,364. (No model.)

To all whom it may concern:

Be it known that we, JOSEPH M. UPTON, of Atlantic, and WILLIAM S. GRAY, of Braintree, in the county of Norfolk and Commonwealth of Massachusetts, citizens of the United States, have invented a new and useful Improvement in Equalizing Truss-Hinges, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming a part of this specification, in explaining its nature.

The invention relates to the herein-described hinge, which is especially adapted for heavy doors for any use and which is intended not only to strengthen the door, but to also assist in the preliminary and easy hanging of the door and in removing its sag when required; also, in preventing the same.

We will describe the invention in conjunction with the drawing forming a part of this specification, in which the figure is a view in elevation of the parts of the hinge applied to a door-frame and door.

Referring to the drawing, the hinge comprises the butts A A' of any desired construction and which are bolted or otherwise fastened to the door frame or support. Each of them is arranged to provide two bearings for the pintle, which connects it with the other member of the hinge. These bearings are lettered *a a'* in each butt, and they are separated from each other by a space *a²* of sufficient width to receive the end of the other member of the hinge and also the adjusting-nuts upon the pintles herein described.

The upper movable member of the hinge, which is attached to the door, comprises the bar B of varying length, as the size or weight of the door may require, but preferably shorter than that shown in the drawing. Through a hole in the inner end of bar B extends the pintle *b*, connecting the same with the butt A, while from its outer end, integrally fastened thereto, extends the truss-bar B' diagonally upward and backward to the point *b'*, which will bring it near the upper inner corner of the door and from thence downward and backward to bring its end *b²* over the top of the upper bearing *a* of the butt A. This truss-bar B' is not attached throughout its length to the door, but only where its end

forms the integral connection with the bar B. This integral connection with the hinge member is not necessary, but only furnishes a more feasible construction. Any other means by which the bar B' may be attached to the door, so as to admit of a certain amount of springing or yielding, would suffice. Being thus hung or suspended when proper force is applied, as by a straining device connecting the bar B' with the lower hinge member or the door, the bar B' would naturally spring or be drawn down toward the bar B. Instead, however, of the bar B' springing down, which of course it cannot do by reason of its resting on the solid butt at *b³*, an indirect action occurs, and the bar B, or rather the door, is drawn up and so permitting of the adjustment, as will be described later. The end *b²* of the bar B' rests upon the upper surface of the butt, forming a main bearing *b³* of the hinge and of the door, and in said end *b²* is a hole, through which the pintle *b* extends, the pintle having a headed end *b⁴* to rest upon its upper surface *b⁵*.

There is used with the butt A' the hinge member C. This is also of varying extension, preferably shorter than as shown in the drawing. It comprises a straight bar C', having at its inner end a hole, through which the pintle *c*, attaching it to the butt, extends. From the outer end of this bar and integral with it there extends a truss or brace bar C², which is shaped to first extend downward to the point *c'* near the bottom or lower outer corner of the door and then backward and upward to the inner end of the bar C', where it is integral with it.

Both the upper and lower door members of the hinges, it will be seen, have what might be called a "truss construction"—that is, the straight portion of each is reinforced by a bar having a truss action, and which stiffens each member and also serves to reinforce and stiffen the door, as well as assisting in its adjustment. It will be seen that the portions of each member which form the trusses bear opposed relations to each other and that they are connected at their apexes or points *c'* and *b'* by a brace and tie rod D, which, in effect, extends downward across the door from near its upper inner corner to near

its bottom or lower outer corner. This tie-rod D is made in two parts d and d' . The part d is pivoted at its upper end to the truss-bar B'. The part d' is pivoted at its lower end to the truss-bar C². The contiguous ends of the two parts are slightly separated from each other and have screw-threads for receiving a turnbuckle d^2 , by means of which the said rod may be shortened or extended, and thus be made to serve as a means of draft or extension between the bar or arm B' and the lower hinge member or the door, for the tie-rod D at its lower extremity could be pivoted directly to the door and still permit of the desired actions. The construction indicated, however, is the most feasible. Now when the tie-rod D is shortened by means of draft upon the turnbuckle the door would rise on its pintles. The bar in arm B could not be drawn down, for, as before described, it sets firmly on or against its butt; but it yields or springs sufficiently to permit of the door being drawn up or a vertical action obtained. If the door was so fixed that no vertical action could be had along its inside edge when stress is applied to the turnbuckle, a torsional action would be had. In other words, the outer portion only of the door would be raised or adjusted. Thus the tie-rod D serves not only to so tie the two members of the hinges together as to add to the strength of each and to the strength of the door, but it also acts as a means for the adjustment of the door with respect to the door-frame, assisting when hanging the door in lifting the same, so that it may swing freely in its frame-opening, as will be described later, also assisting in moving the outer portions of the door vertically with respect to the inner ones with such torsional movement, for instance, as would be necessary for removing sag from it or rendering other necessary adjustment.

The lower pintle c is held stationary in the bearings of the butt A' in any desired way. The portion between the butt-bearings is provided with a screw-thread c' , upon which the adjusting-nut c^2 and the check-nut c^3 are held. The inner end of the lower hinge member C bears upon the adjusting-nut, which forms the second bearing of the door and which co-operates with the main or upper bearing above spoken of. The upper pintle b is also held stationary in its bearing in any desired way. It has a threaded section b^7 below the upper bearing a and upon which is a nut b^8 and a check-nut b^9 . The nut bears against the lower end of the said upper bearing a and serves to hold the end b^2 of the truss-bar B firmly on its rest-bearing at the upper end of the pintle-bearing a . The material function of the nuts, however, is when the nut b^9 is moved down against the bar B and the nut b^8 becomes a check-nut, preventing any upward movement of the door along the vertical inside edge. This downward movement of the nuts is employed only when a torsional movement is given to the door to remove sag or

otherwise by the turning of the turnbuckle of the tie-rod D.

In hanging the door, although various methods are possible through the construction, the following is the most expedient: The door is first rested in its casing, so that the ends of the bars B and C lie in their respective frame-openings, the end of B resting upon the upper surface of the rest a' of the upper hinge, while the end b^2 of the bar B' rests upon the upper surface of the rest a . The pintles are then inserted, with the adjusting-nuts, respectively, on the threaded surfaces b^7 and c' , the nuts b^8 b^9 of the upper hinge being turned up against the lower surface of A, holding the end b^2 of the truss-bar B firmly on the rest-bearing a at the upper end of the pintle-bearing a , and so leaving a sufficient opening for the upward vertical movement of the end bar B along the pintle, the nuts b^2 b^3 of the lower hinge being at this time naturally placed upon the upper surfaces of the rest a' of the lower hinge. The door is now ready to be raised, so as to hang free from the base of its casing. This is done by turning the turnbuckle on the tie-rod D, the door being raised by this adjustment. The bar B' springs sufficiently to allow of the action, while the under surface b^3 of the end b^2 maintains a proper relation to its rest a by reason of the angular construction of the bar B'. The nuts on the pintle at c' are then turned upward to provide a rest for the bar C. Thus the door is expeditiously hung, and so adjusted as to make sag well nigh an impossibility. If, however, it becomes necessary to true the door for rectifying sag or otherwise, it can be done without removing the door from its butts by means of the turnbuckle, the adjusting-nuts b^8 b^9 first being turned downward against the upper surface of the bar B to prevent any upward movement of the inside edge of the door before the turnbuckle is turned. Thus the outer edge of the door is raised by the administration of a torsional strain and the door trued. In fact, by means of the turnbuckle along or in conjunction with the pintle-nuts the door is capable of any adjustment.

It will be seen that the upper hinge member has two swinging bearings on the pintle and one rest-bearing on the butt and that the lower swinging bearing is movable vertically on the pintle. It will also be seen that the lower hinge member has a swinging bearing that is vertically adjustable on the pintle and that its rest is also vertically adjustable on the pintle.

As regards the springing of the bar B', inasmuch as the door would naturally be raised only so far as to swing free and clear the spring of the bar B' would hardly be perceptible to permit of this, and fastened as the bar or arm is to the bar B and mounted as it is on the butt and pintle the spring or the bar or arm would hardly be outward, but with shear motion relatively to the bar B. This springing or yielding of the bar B' is perhaps

not so essential to the torsional adjustment of the door as it is to its hanging, for in the former adjustment the nuts being screwed down against the hinge member B prevents
 5 any upward movement of the door, so that the position of the bar B with the bar B' is relatively preserved, and the screwing up of the turnbuckle results only in adjustment of the outer portion of the door.

10 Having thus fully described our invention, we claim and desire to secure by Letters Patent of the United States—

1. The door-hinge having two butts adapted to be secured to the door-jamb, each butt having two bearings for a pintle and relatively
 15 long openings between, pintles mounted in such bearings, the hinge members secured to the door mounted and vertically adjustable on such pintles, and means for such vertical adjustment substantially as described.

2. The door-hinge herein described, the same comprising hinge members secured to the door, suitable butts, pintles carried by the butts having threaded sections, nuts carried
 25 upon said threaded sections, those of the upper pintle offering adjustable bearing, and that of the lower pintle adjustable support to the corresponding hinge members fastened to the door substantially as described.

3. A door-hinge consisting of butts adapted to be secured to the door-jamb, pintles mounted in the butts having threaded sections and nuts thereon, members of the hinge secured to the door, one of which members has a bar
 30 or arm mounted upon the pintle and resting upon the butt, and the other a bar or arm mounted upon the pintle to rest upon the nut carried thereby substantially as described.

4. A door-hinge having butts adapted to be secured to the door-jamb, pintles mounted therein, hinge members secured to the door pivotally supported by said pintles, an arm
 40 also pivotally mounted, and resting upon or against a butt secured to the door-jamb, with regard to which arm the door is adjustable, and means for effecting the adjustment substantially as described.

5. A door-hinge comprising in its construction hinge members secured to the door, one of which has a yielding arm attached thereto
 50 and extending therefrom to rest upon a butt, means for holding such arm to the butt, butts and pintles so arranged as to provide suitable rest and mounting for the door members of the hinge and arm aforesaid, and means for
 55 adjusting the door with respect to the said arm, resting upon the butt aforesaid substantially as described.

6. A door-hinge comprising in its construction hinge members secured to the door, one of which has an arm attached thereto and extending therefrom to rest securely upon a
 60 butt, the door being adjustable with respect to such arm, means for effecting such adjustment, butts with pintle-bearings having relatively wide openings between, pintles securely
 65 mounted therein offering pivotal support to

the door members of the hinge as also to the arm mounted on the butt and nuts mounted on the pintles, as and for the purposes de- 70 scribed.

7. In a hinge for doors and similar uses, hinge members fastened to the door extending across the same, separated from each other, and each of which has a truss reinforcement- 75 bar with a stay or brace rod connecting the two members substantially as described.

8. A door or other hinge having two reinforced members, the reinforcement of one of which extends near the inner upper corner of 80 the door and the reinforcement of the other of which extends near the lower outer corner of the door, and a brace or tie rod extending diagonally across the door, connecting said reinforcements near said corners substan- 85 tially as described.

9. A door or other hinge having two reinforced members, the reinforcement of one of which extends near the inner upper corner of the door and the reinforcement of the other 90 of which extends near the lower outer corner of the door, and a brace or tie rod extending diagonally across the door, connecting said reinforcements near said corners, and means for shortening or lengthening said brace or 95 tie rod substantially as described.

10. A hinge having a member provided with two swinging pintle-bearings and a rest, a member provided with a swinging bearing and a rest, means for straining or drawing 100 together the members diagonally the door, the hinge butts and pintles carried by the butts, the pintles and butts being combined to provide a vertical adjustment of the hinge members and rests with respect to the butts 105 substantially as described.

11. The combination in a hinge of two butts, one of which has a rest for the arm of a hinge member, a pintle mounted securely therein to provide a bearing for the arm of the hinge 110 member above the rest and a bearing below it, the other of said butts having a stationary pintle and a movable rest mounted upon said pintle, hinge members constructed and shaped as described to engage said pintles and rests 115 as specified, and a straining device connecting the hinge members with each other as set forth.

12. The combination in a hinge of a yielding arm attached to a hinge member fastened 120 to the door, and extending therefrom to rest securely upon or against a butt secured to the door-frame, with a tie-rod connecting said arm with the door, and means for shortening or lengthening the same as and for the pur- 125 poses described.

13. The combination in a hinge, of butts adapted to be secured to the door-jamb, pintles mounted therein, door members of the hinge pivotally mounted upon said pintles, 130 one of which members has a bar or arm attached thereto and extending therefrom to rest upon or against a butt secured to the door-frame, with a brace or tie rod, and means

for lengthening or shortening the same connecting said arm with the door, so that the said door may be vertically or torsionally adjusted substantially as described.

- 5 14. The combination in a door-hinge of butts adapted to be secured to the door-frame, pintles mounted therein, hinge members secured to the door pivotally mounted upon said pintles, an arm also pivotally mounted, 10 and resting upon or against a butt secured to the door-frame, with regard to which arm the door is adjustable, with means for effecting the adjustment consisting of a tie-rod connecting said arm with the door, and means 15 for lengthening or shortening the same, as and for the purposes described.

- 15 15. A door or other hinge having two members fastened to the door, a supplementary arm integrally attached to and suspended 20 from one, extending up to near the inner upper corner of the door, then down to proper angle to rest upon its butt, the other member with reinforcing-arm extending down to near the bottom or outer corner of the door, a 25 brace or tie rod extending diagonally across the door connecting said supplementary arms, means for shortening or lengthening said brace or tie rod, butts, pintles whereby the door members of the hinge are pivotally con- 30 nected to said butts and means for adjusting

the hinge members secured to the door as aforesaid with respect to the arms aforesaid so that a vertical or torsional movement may be obtained as described.

16. A door-hinge comprising in its construction 35 hinge members secured to the door, a supplementary arm attached to and extending from one hinge member fastened to the door to rest securely upon or against a butt secured to the door-frame, with respect to 40 which arm the door is adjustable, means for effecting such adjustment consisting of a tie-rod extending diagonally across the door and connecting said supplementary arm with the other hinge member secured to the door, 45 means for shortening or lengthening said tie-rod, butts with pintle-bearings having relatively long openings between, pintles mounted thereon, whereby the door members of the hinge are pivotally connected to said butts, 50 and nuts mounted upon said pintles offering adjustable bearing and support to the hinge members secured to the door as and for the purposes set forth.

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