

HINGES.

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UNITED STATES PATENT OFFICE

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IMPROVEMENT IN HINGES.

Specification forming part of Letters Patent No. **177,708**, dated May 23, 1876; application filed January 13, 1876.

To all whom it may concern:

Be it known that I, JAMES K. GILFILLAN, of the city of Syracuse, county of Onondaga, and State of New York, have invented new and useful Improvements in Hinges, which are fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a perspective view of the hinge. Fig. 2 shows the several parts of the hinge relatively placed correspondingly to their position in the completed hinged.

My invention relates to that class of two-way hinges, in which each hinge includes two plates and two cross-bars at opposite ends of the hinge, and in which each cross-bar is pivoted at its ends to corresponding sides of each plate; and my invention consists in, first, an improved plate; second, an improved cross-bar; third, a combination of two plates as far as improved for adaptation to the improved cross-bars, with two of my improved cross-bars with suitable connections for strengthening the hinge; and, fourth, in the union and arrangement of two of my new plates entire with the cross-bars as improved, and with suitable connections, having strength additional to that afforded by the elements of the next above mentioned part of my invention; and, fifth, a combination of two plates, having formed in each of them the recesses hereinafter described, with two cross-bars and suitable connections.

In the drawings hereof, A represents my improved plate, furnished with holes for screws or other means of attaching the plate to the door or door-casing. D D are knuckles at a distance from opposite ends and on opposite sides of the plate, and having in that end nearer the end of the plate a recess, screw-threaded for the reception of screw-threaded pintles H H'. The longer sides of the plate A may have longitudinal bevels C extending outward from the front to the rear surface of the plate, and these bevels may be curved in cross-section. These bevels are not necessary to the operation of my hinge, but render the hinge more compact, and enable the edges of the plate to rotate closely to the nearly-cylindrical bosses D D, when all the parts

are in position for operation. The pintles H H' are shown screw-threaded at both ends. I I' are nuts internally screw-threaded, that the bolts and nuts and bosses may be united in the order hereinafter to be described. These parts, however, may be united by driving-joints, or the pintles H H' may be formed in the piece with the knuckles D D, and the pin-
tle H' may be likewise in one piece with the nut I'. To the well-known cross-bar of this style of hinge I have added at each end the supplementary knuckles D', having shoulders or offsets J J, which give the cross-bars, when in position on the plate, a longer bearing on the pintles H H'. The knuckles D D are formed at a suitable distance from the end of the plate A to afford room for the shoulders or offsets J J of the supplementary knuckle D' to pass alongside of the plate A, where they may at times be steadied by the edges.

This construction of the supplementary knuckles D', having shoulders or offsets J J and knuckles D D, strengthens the hinge against all cross or diagonal strains, to which all hinges are subjected, and prevents the hinges from rocking vertically.

At each end of the plate A is a recess, E, formed therein, having its bottom and sides, respectively, corresponding nearly or quite to the surfaces of the longer and shorter sides of the cross-bars, in order that the cross-bars will readily pass into, rest in, and pass out of these recesses during the operation of the hinge, and that the sides of the bars may have bearings against the bottom and sides of the recesses, for a purpose to be hereinafter set forth.

When the plate having recesses is used with the well-known form of cross-bar—that is, that form which has no shoulders—the outer ends of the knuckles D D are made flush with the inner sides of the recesses E.

The parts are placed in operative position as follows: The pintles H H' are screwed firmly into the knuckles D D. The remaining pintle H' is as firmly screwed or secured to the nut I'. One of the plates A is then lifted above the plane in which the other plate A rests, and one cross-bar is slid onto the two parallel pintles H H'. The upper plate is then

dropped down alongside of the other, when the plates A A will be close together, and adjacent knuckles will overlap each other, and the cross-bar will rest in the recess E. The nuts I I are then screwed onto the pintles H H, and one cross-bar is secured. One end of the other cross-bar is slid onto the remaining pintle H, its free end pointing away from the plate A, and dropped into the adjacent recess by being turned pivotally on the pintle H, and its unfastened end now opposes that one of the knuckles which has no pintle H. The pintle H' is then inserted through the unfastened end of the cross-bar, and screwed into the underlying knuckle. This completes the hinge.

The hinge being set as usual into an excavation of the door or its casing until the outer surfaces of the wood and of plate A are flush with each other, it will be seen that the outer side K of the recess E at the lower end of the plate rests closely against the wood of the door or door-casing, and therefore causes the wood at that point to bear a portion of the strain and weight, which, were there no recess, would be supported entirely by the screws. It must be borne in mind here, that heretofore in this class of hinges the plate has had no recess E, and that an excavation of the door was necessary away from the end of the plate to receive the cross-bars, which lay between the end of the plate A and the side of the excavation in the wood. The hinge plate A, the cross-bar being turned out, had no support for its end, and the strain on the hinge fell entirely on the screws. In this new construction the bottom and sides of the recesses E E aid to support the screws in their resistance against the weight of the door. The recesses at the upper end also aid in this respect by furnishing a close bearing of the plate against the wood above it, and so resist lateral strain. The recesses E E effect another substantial benefit in this style of hinges. Without the recesses the weight on each plate bears on diagonally-disposed knuckles, and hence the strain is diagonally across the plate. But when the recesses E E have been added to the plate, the cross-bars rest more or less in them. They press against the sides of the recesses, and thus a part of the weight and strain is transferred from knuckles on opposite sides and at opposite ends of the plate to or near the center of the plate alongside of the recesses. Thus the strain is changed from a diagonal to nearly a vertical direction, and the capacity of the hinge to resist the weight of the door is materially increased. It is obvious that the hinge is operative without the recesses E E, and I may therefore construct the hinge without them, though I prefer the hinge with them.

The main operation of the hinge is as follows: Whichever way the door is opened it

always pivots on that side of the hinge toward which the door is moving; as, if one enters the door pushing it from him, the door pivots on the side of the hinge farther from the person, but if one pulls the door toward him to open it, then the door pivots on the side of hinge nearer the person. The door then pivots on the side of the hinge toward which the door is moving. One of the cross-bars pivots on that side, and, being confined at its other end to the plate which is on the door, is swung around with that plate, while the other cross-bar not being confined to the swinging side of the swinging plate remains set in the recess of the plate on the casing. On the contrary, the door being reversely opened, the plate attached to it pivots on the edge, which before was the swinging edge of the hinge, and the cross-bar which before swung with the plate, because confined to the swinging edge, is now left behind in the recess of the stationary plate, while the other cross-bar which before was left behind is now curved around with the moving plate because confined to its swinging edge. So when the door opens one way it swings on a boss and on its diagonally-disposed cross-bar, but when the door opens the other way it swings on the other boss and the other cross-bar.

What I claim as new, and wish to secure by Letters Patent, is—

1. A hinge-plate, A, having knuckles D D on its opposite sides, and near to its opposite ends, and provided with recesses E E, formed therein, one in each end thereof, as and for the purpose described.

2. The cross-bar F, having supplementary knuckles D', having shoulders or offsets J J, as and for the purpose described.

3. The two plates A A of the same construction, each having the knuckles D D on its opposite sides, and near to its opposite ends, in combination with two cross-bars, F F, having supplementary knuckles D', with shoulders or offsets J J, and with suitable pintles and nuts, as and for the purpose set forth.

4. The two plates A A of the same construction, each having the knuckles D D on its opposite sides, and near to its opposite ends, and having recesses E E formed therein, in combination with cross-bars F F, having supplementary knuckles D', with shoulders or offsets J J, and with suitable pintles and nuts, as and for the purpose set forth.

5. In a two-way hinge, the combination of two hinge-plates, each having a recess formed therein, at each end thereof, as described, with two cross-bars, and with suitable pintles and nuts, as and for the purpose set forth.

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Witnesses:

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