

No. 819,098.

PATENTED MAY 1, 1906.

D. UNDERHILL.
HINGE.

APPLICATION FILED MAR. 20, 1905.

2 SHEETS-SHEET 1

Fig.1.

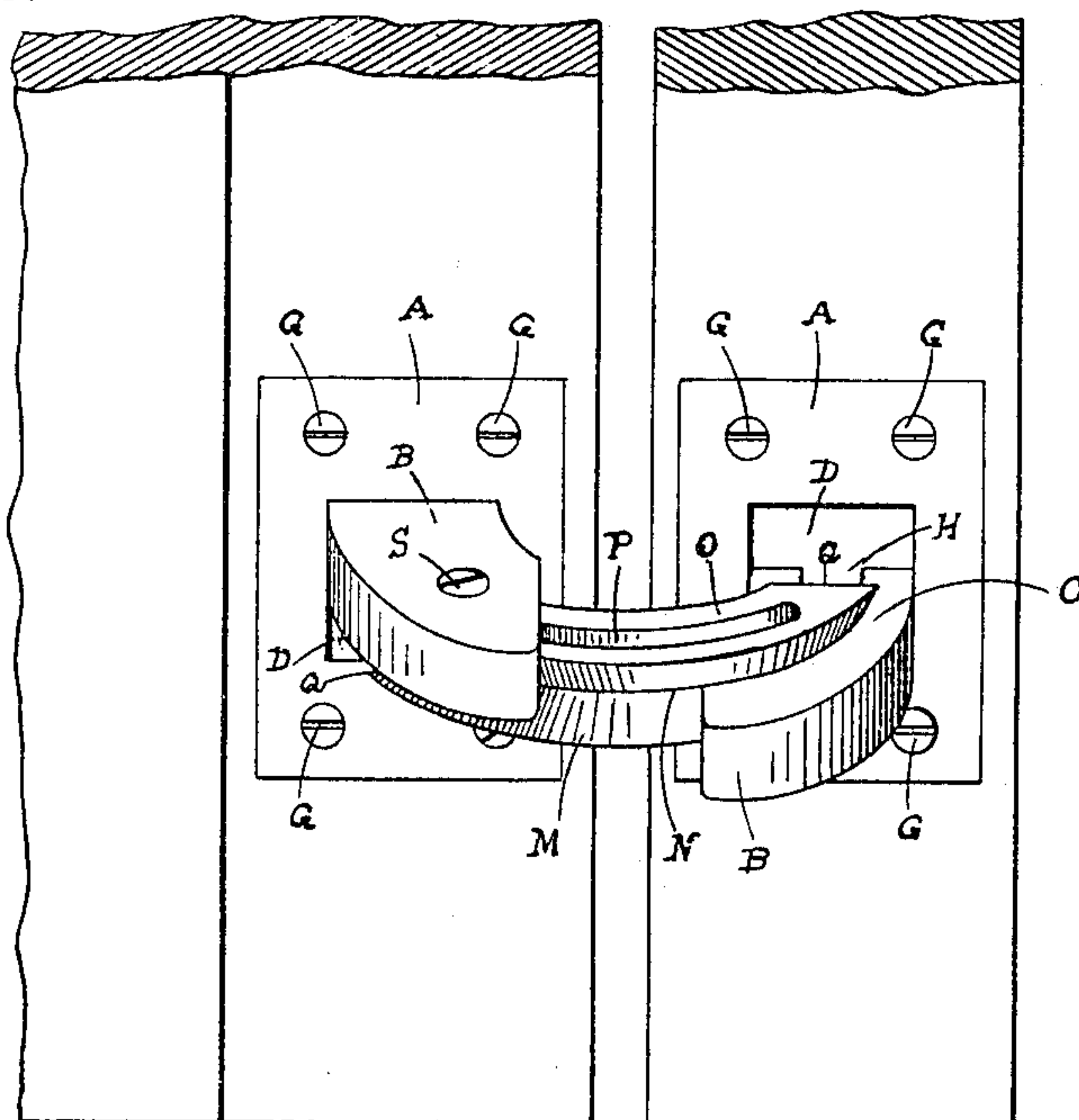
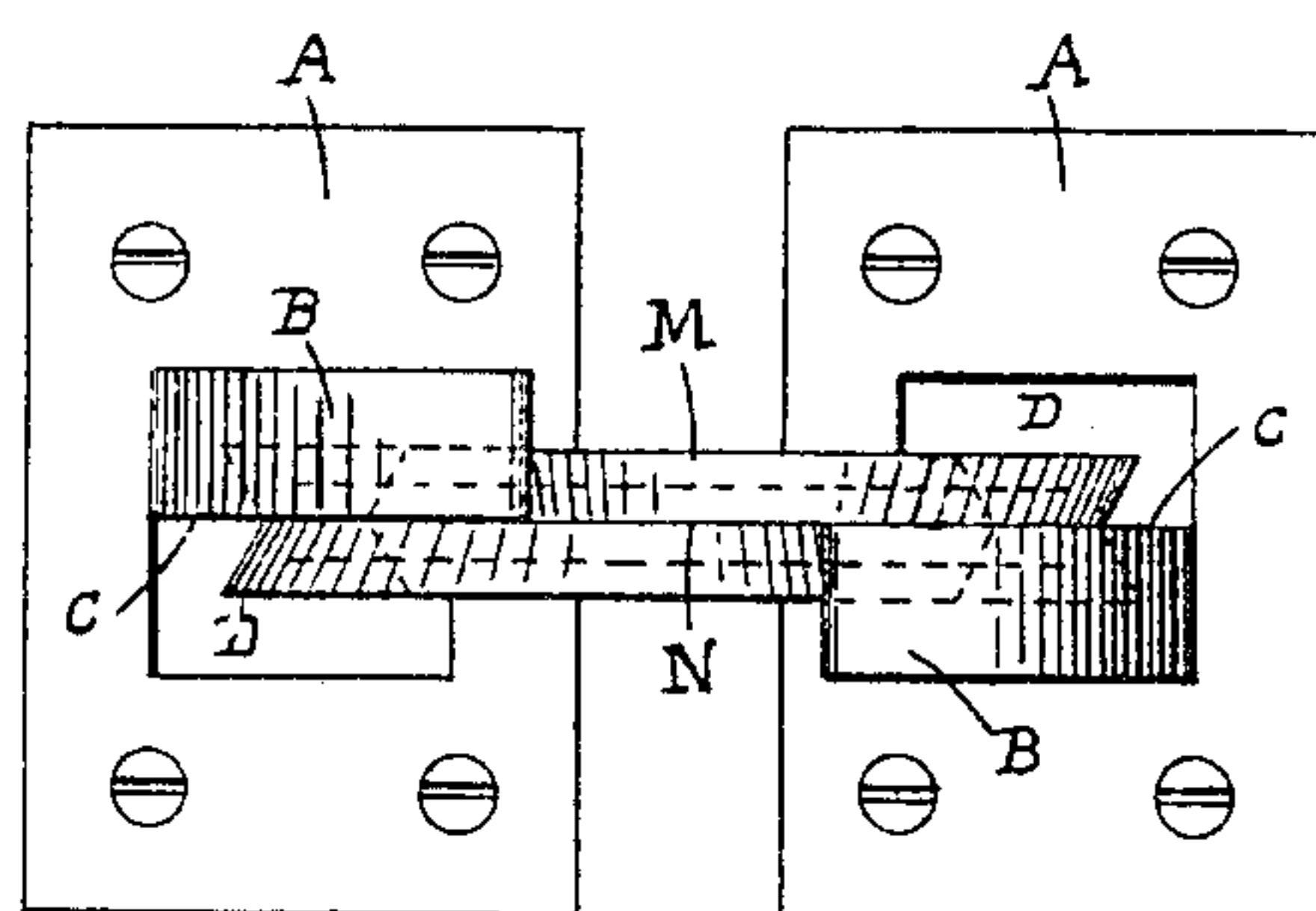


Fig. 2.



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2 SHEETS—SHEET 2.

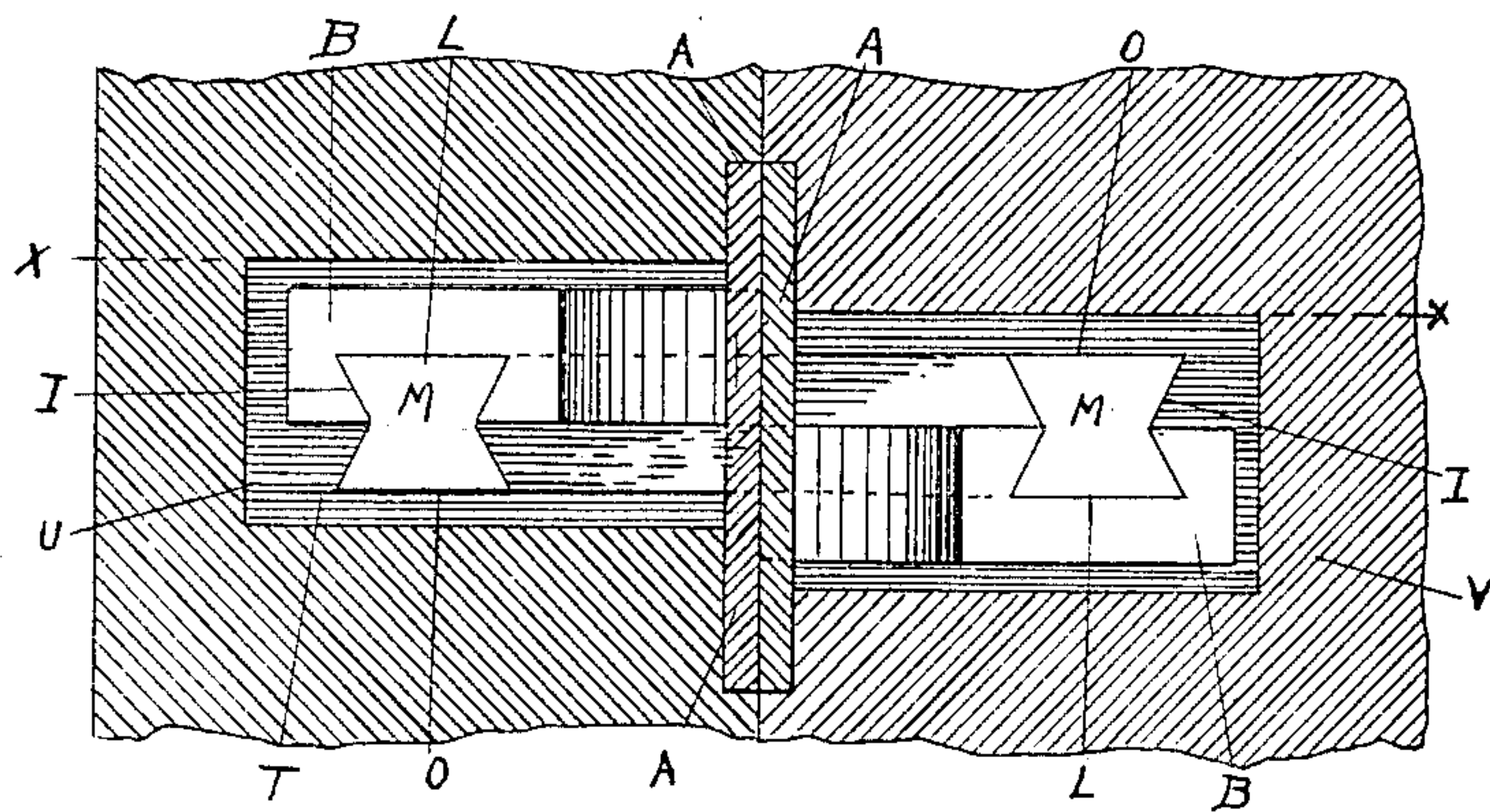


Fig. 3.

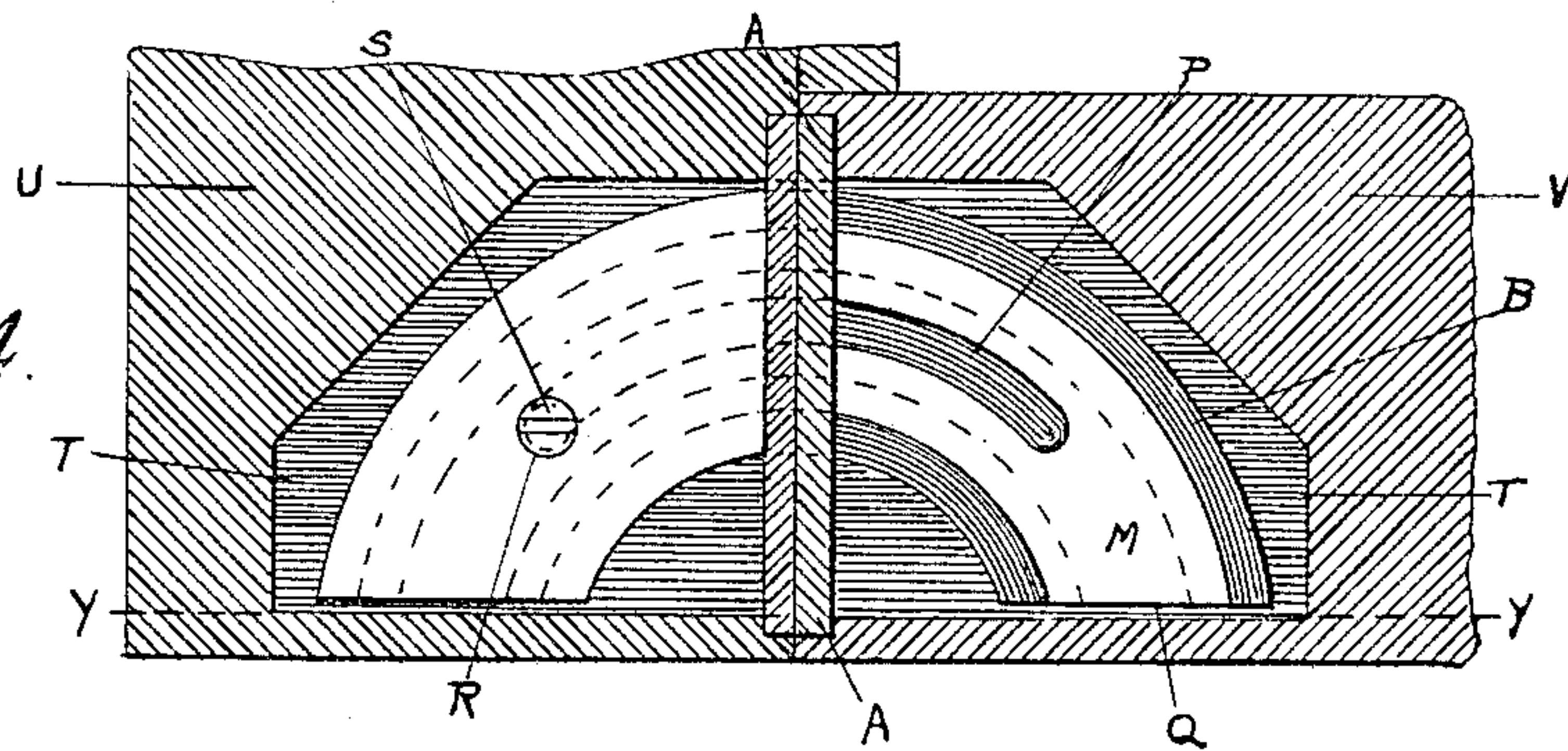


Fig. 4.

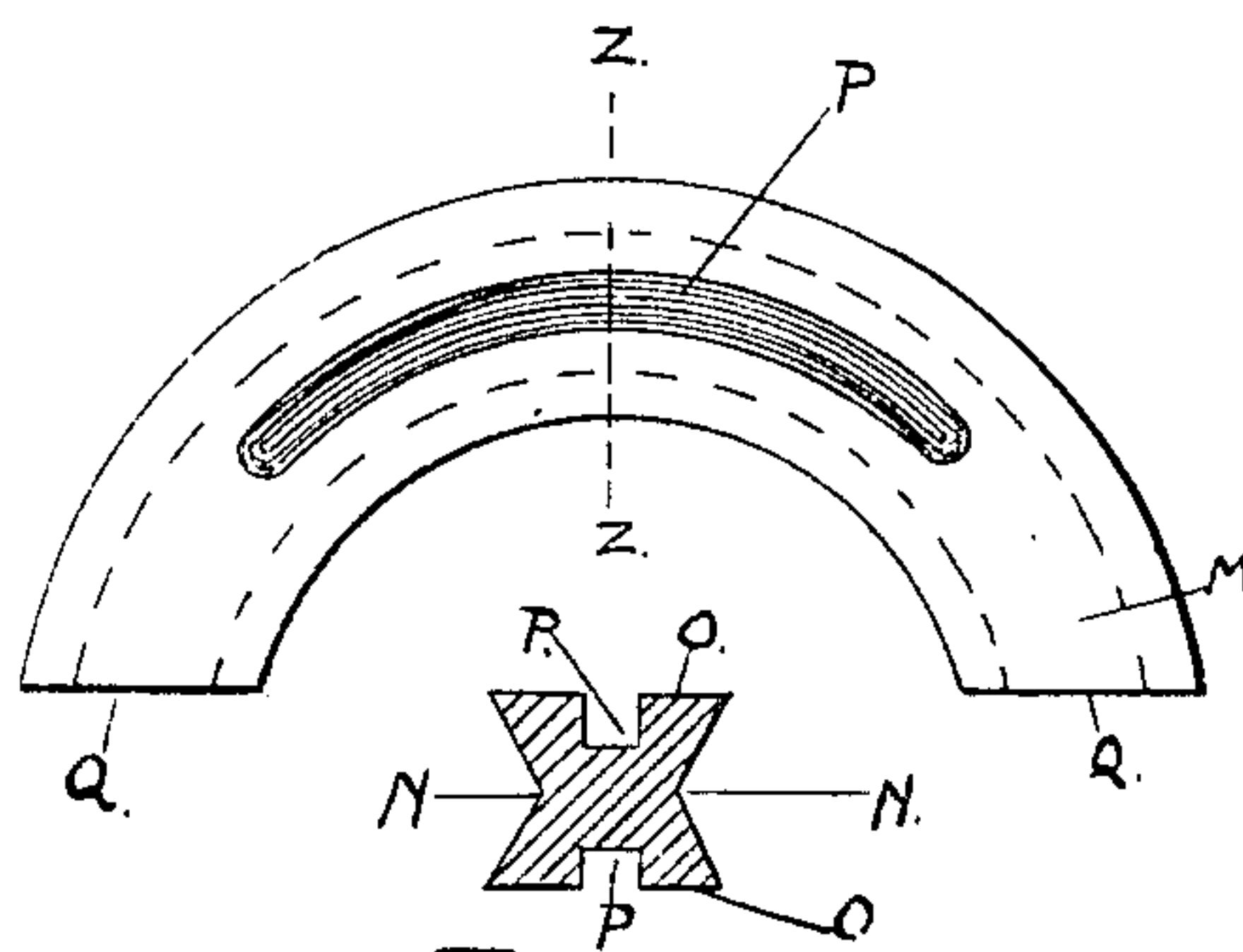


Fig. 5.

Fig. 6.

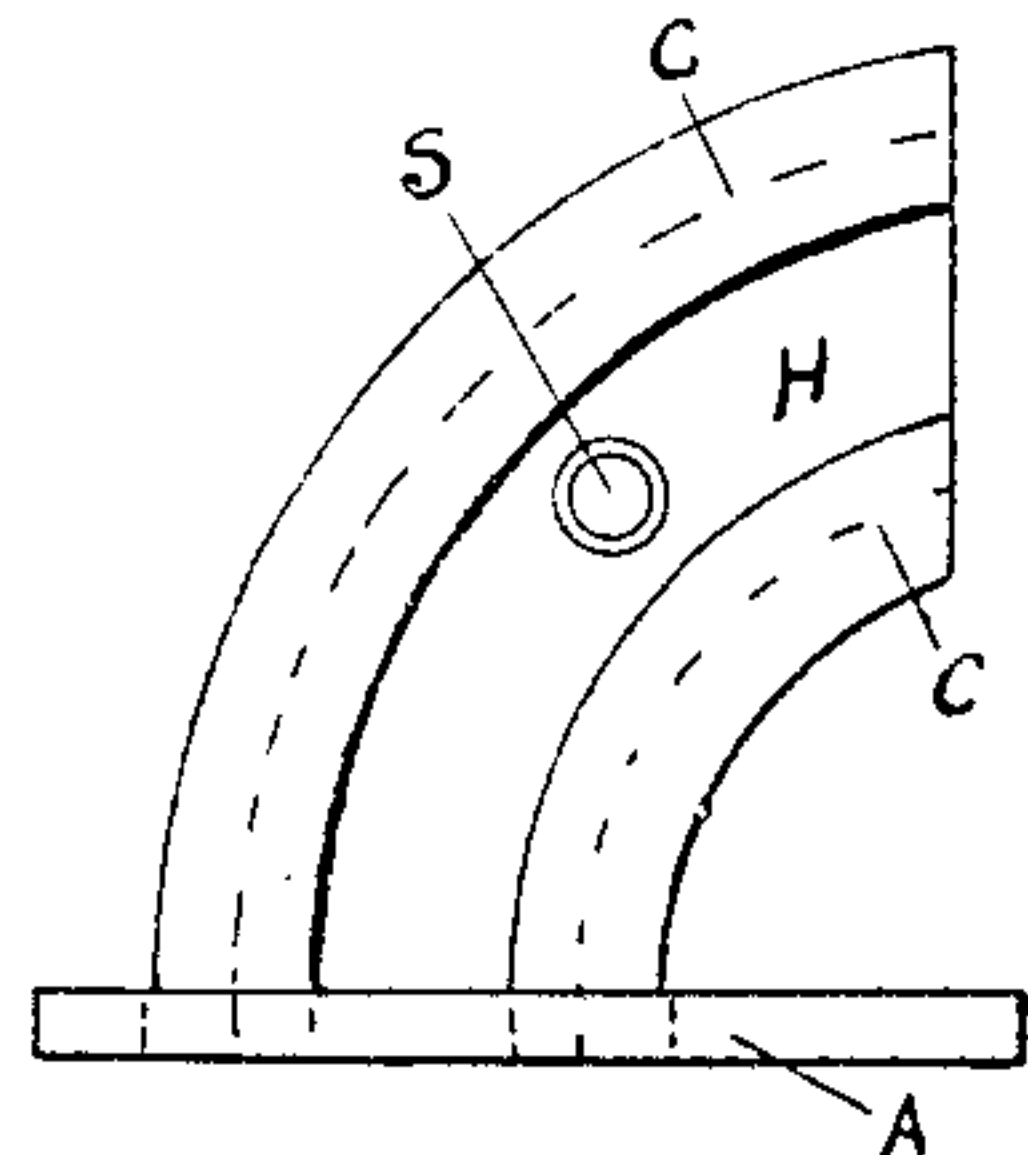


Fig. 7.

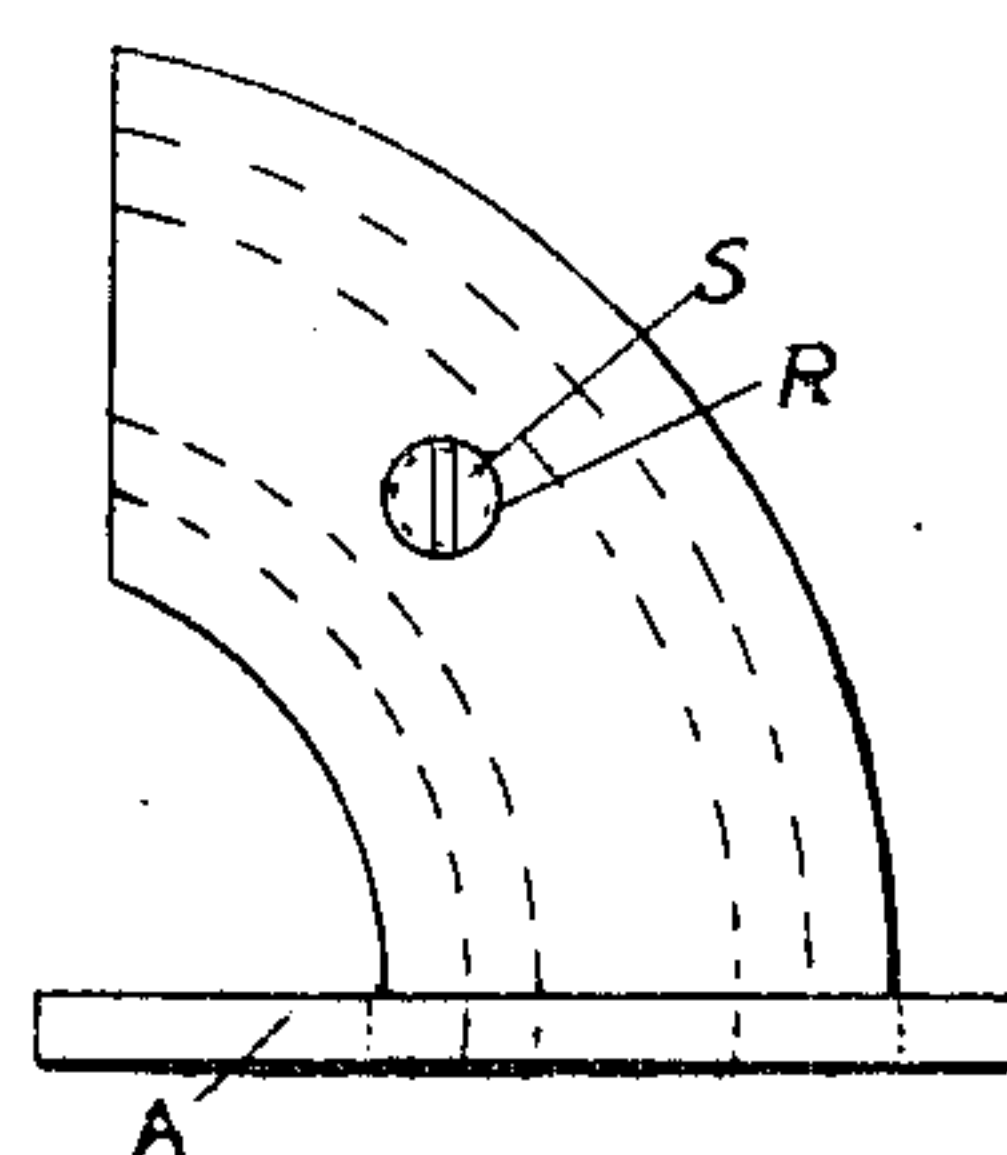


Fig. 8.

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UNITED STATES PATENT OFFICE.

DILLEN UNDERHILL, OF TOLEDO, OHIO.

HINGE.

No. 819,098.

Specification of Letters Patent.

Patented May 1, 1906.

Application filed March 20, 1905. Serial No. 250,914.

To all whom it may concern:

Be it known that I, DILLEN UNDERHILL, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented a new and useful Improvement in Hinges, of which the following is a specification.

My invention relates to a hinge, and has for its object to provide a simple, strong, durable, and efficient device of the kind that is readily attached and that is adapted to support a door or the like centrally of the hinge-plates and of the abutting faces of the door and the jamb; furthermore, to provide a hinge that is entirely concealed from view when the door is shut. I accomplish these objects by constructing a hinge as hereinafter described, and illustrated in the drawings, in which—

Figure 1 is a perspective view of my invention in open position and shown attached to portions of a door and a jamb. Fig. 2 is a front elevation of the hinge when open. Fig. 3 is a vertical section on line Y Y of Fig. 4 of the hinge-plates, door, and jamb with the door in closed position. Fig. 4 is a horizontal section on line X X of Fig. 3 of the hinge-plates, door, and jamb with the door in closed position. Fig. 5 is a side view of the dovetail segmental key. Fig. 6 is a cross-section of the same on line Z Z of Fig. 5. Fig. 7 is an end elevation of a hinge-plate, showing the groove-face of the segmental lug; and Fig. 8 is a reverse view of the same.

In the drawings, A A represent duplicate rectangular base-plates having greater length than width, each having projecting from its outer face in a plane perpendicular to the base an integral lug B in the form of a segment of a flat ring. The outer curved face of the segment is a few degrees less than a quadrant of its complete circle, and the free end of the segmental lug is in a plane perpendicular to the base-plate near and parallel with one of the side edges of the plate. The opposite end at its junction with the base-plate is radial to its circle with the face of the base-plate in a plane of the axis of its circle. The lug is located at equal distances from the side edges of the base-plate with one side face C of the segment in a plane perpendicular to

the base-plate central, between, and parallel with its ends.

At the base of lug B, flush with its face C, is a rectangular opening D in the base-plate of length and breadth slightly greater than the corresponding dimensions of the base of the lug B, and the end portions of the base-plate are provided with a suitable number of screw-holes to receive the screws G.

Central in the face C of the lug B is provided the dovetail groove H, the sides I of which preferably diverge from the face inward at equal angles to the inner face L of the groove, which is parallel with the outer face C of the lug, but may be otherwise suitably enlarged inwardly from the opening in the face. The groove extends from the outer end of the lug through the base-plate on lines that are concentric to the outer faces of the lug.

The base-plates A thus constructed are made complementary to each other by placing the plates in the same plane with one plate reversed relative to the other, so that the ends of the two plates are in line and the lug of each plate is curved toward the base of the other plate, as shown in Figs. 2, 7, and 8. In this position the faces C of the lugs B coincide with the same plane.

The two plates A are movably locked together by the dovetail key M, which is also in the form of a segment of a ring, being less than one-half its complete circle, with its ends perpendicular to its sides and coinciding with a plane that is parallel with a plane of its axis.

The outer and inner faces of the segmental key M are provided with V-shaped grooves N, adapting a longitudinal one-half of the key to be inserted endwise into the groove H of the lug B of one plate and the opposite end of the other half into the groove H of the lug B of the companion plate.

Central of and concentric with each of its sides O the key M is provided with the arc grooves P, terminating at equal distances from the ends Q of the key. Opposite each groove P the lugs B are provided with screw-holes R, into which are run the screws S, the inner ends of which extend into the grooves P and are formed as stops which prevent the

withdrawal of the key M from the lugs, while permitting the free movement of the lugs B on the key and of the key in the lugs between the limits of the ends of the grooves P, whereby either one of the plates A may be moved back and forth through an arc of the circle of its groove H from a common plane with the other plate, as shown in Figs. 1 and 2, into face-to-face contact therewith, as shown in Figs. 3 and 4, the lugs B in the latter relative position of the plates extending oppositely through the openings D of the plates, as shown in Figs. 3 and 4.

During a closing-together movement of the plates the key M does not move with the lug B of the moving plate until the dog S of the lug of the moving plate reaches the opposite end of the groove P, into which it projects, when the dog S will carry the key along with the moving lug B through the dovetail groove H of the lug B of the other plate until the dog S of the lug B of the opposite plate reaches the outer limit of the groove P of the key, into which it projects. The grooves P are arcs of equal chord and radii and are of such length that when the plates are fully closed together or fully opened into a common plane the dogs S are at opposite ends of their respective grooves P.

To hang a door with hinges constructed and assembled as described, the plates A of each hinge are respectively secured by screws G to the hinge-faces of the jamb of a doorway and the door in opposite mortises formed therein and having a depth to bring the outer faces of the plates flush with the jamb and door faces, and opposite the openings D of the plates A, thus secured, the jamb and the door are each provided with mortises T of sufficient depth and area to freely receive the portions of the lugs B and the key M that project beyond the plates when the plates are closed face-to-face together, as shown in Figs. 3 and 4.

A door thus hung on my hinges will freely swing thereon through a half-circle from a closed to a fully-open position, and vice versa, and when closed the hinges are entirely concealed from view.

My hinge is especially adapted for use on chests, trunks, and the like for hinging lids, as by decreasing the length of the arc grooves P the lid of the chest or trunk may be opened from a closed horizontal position to any desired degree past the vertical for which the hinges are made, in which position the hinge itself operates as a substitute for the flexible straps usually employed for limiting the degree of opening of the lid and at whatever degree greater than a quarter-circle and up to a half-circle the hinge may be adapted to open. The leverage of the lid when opened to the limits of the groove P is applied as a central

pull perpendicular to the outer faces of the base-plates, thereby greatly adding to the durability of the hinge. For like reasons my hinge is also especially adapted for drop-lids of desks, book-shelves, and the like that are required to be supported in a horizontal position when opened.

While the plates A A for most purposes are preferably duplicates, as herein shown, it is manifest that they may have different areas and also that the lug B of the jamb-plate may be reduced in length if the length of the lug B of the door-plate be equally increased without departure from the principle of construction and operation of my hinge, and such construction is required where a door casing or molding of unusual thickness surrounds the top and sides of the door-frame through which the door has to swing a half-circle to or from a closed position abutting the jamb. In such case the radius of the hinge-circle is required to be increased in order for the door to swing free of the casing; but such increase, if the arc lengths of the lugs are made equal, would require an increase in the cavity T of the door to receive the lug of the jamb-plate greater than the thickness of the door will admit of. In such case, therefore, the casing permitting a suitable extension of the cavity T of the jamb, the arc length of the jamb-lug is diminished and the arc length of the door-lug is equally increased, and the combined arc lengths of the lugs and the key being one hundred and eighty degrees the door will swing through a full half-circle and when the door is closed the lugs B and the key will be housed within the jamb and the door. I therefore do not limit myself in the construction of my hinge to plates that are duplicates or to plates having lugs that are of equal arc lengths.

What I claim to be new is—

1. A hinge comprising a pair of complementary base-plates having complementary lugs that have the form of ring-segments, said lugs having complementary bearing-faces provided with concentric complementary dovetail grooves, and said plates having an opening in each plate opposite and adapted to receive the lug of the other plate, a key that is a ring-segment in form, that in cross-section is complementary to a cross-section of the combined dovetail grooves of the lugs, and that is adapted to movably connect the lugs when partly inserted in the grooves of both lugs, said key having stopped-off grooves, one opposite and abutting each lug, that are arcs concentric of the key, and stops secured, one in each lug, and projecting into the grooves of the key, substantially as set forth.

2. In a hinge the combination of base-plates A, A, having the openings D, D, and the complementary segmental bearing-lugs

5 B, B, provided with the complementary dove-tail grooves H, H, concentric to the arcs of the lugs, the segmental key M, complementary to the grooves H, H, of the lugs, provided with the concentric stopped-off arc grooves P, P, and stops S, S, secured to the lugs and projecting into the grooves P, P, substantially as set forth.

In witness whereof I have hereunto signed my name, in the presence of two subscribing witnesses, this 16th day of March, 1905.

DILLEN UNDERHILL.

Witnesses:

V. W. MOREHOUSE,
GRACE COWDRICK.