

F. W. TOBEY.
HINGE AND LOCK FOR BOX COVERS.
APPLICATION FILED JUNE 18, 1908.

959,971.

Patented May 31, 1910.

2 SHEETS—SHEET 1.

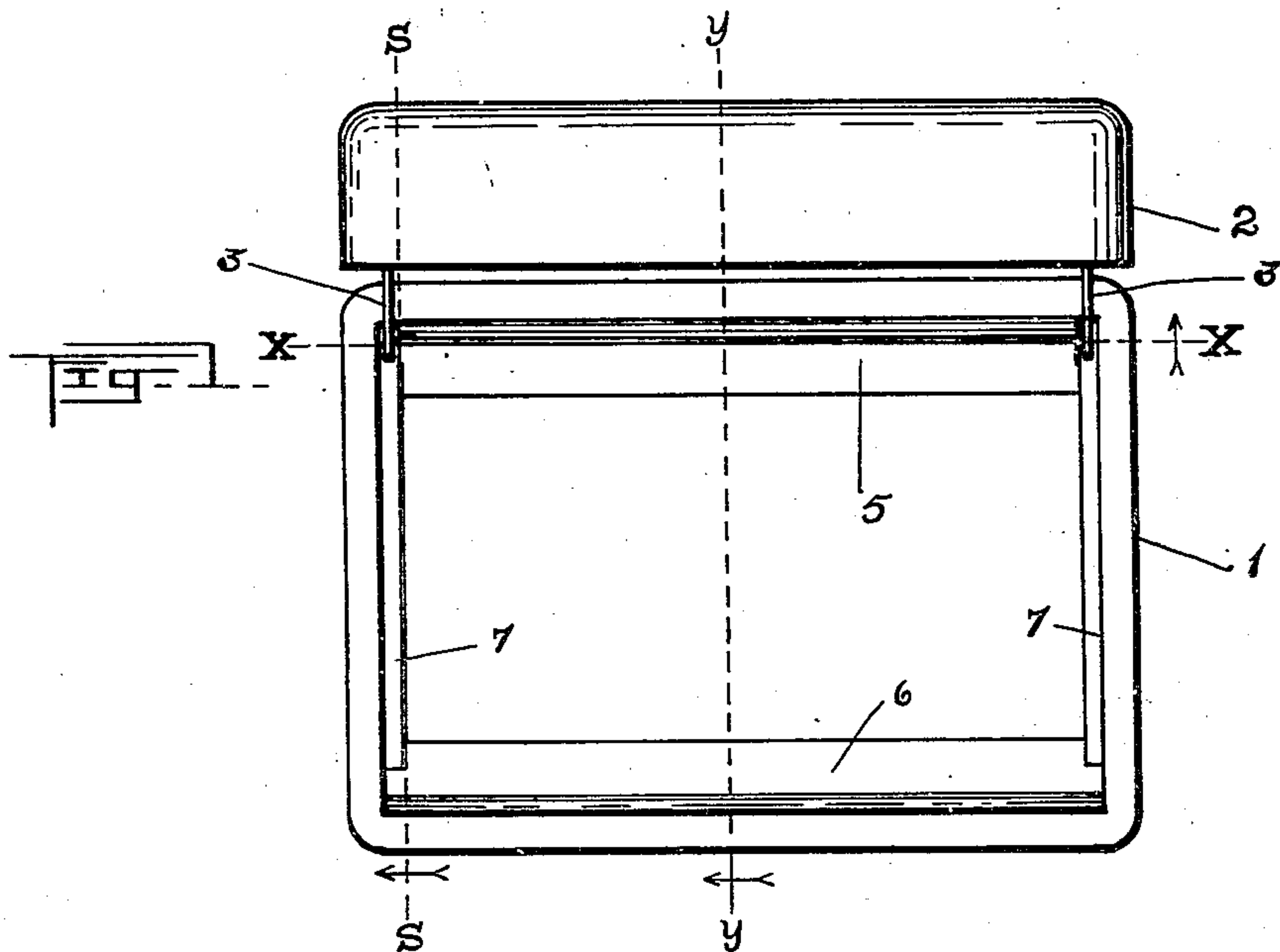
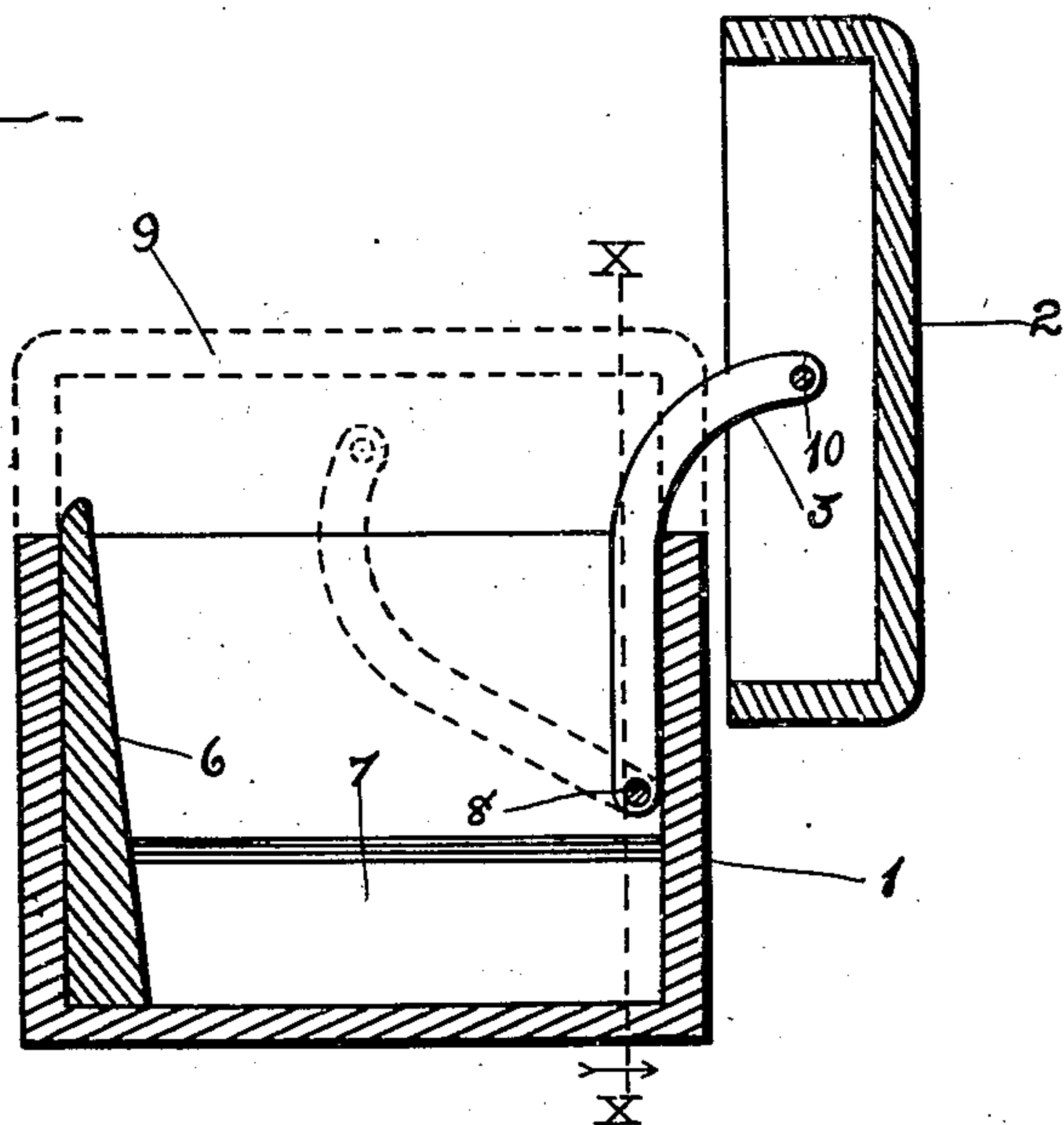


FIG. 2.



WITNESSES:
Charles W. Dake.
Mary S. Looker

INVENTOR.
Fred W. Tobey
BY
Edward Taggart
ATTORNEY.

F. W. TOBEY.
HINGE AND LOCK FOR BOX COVERS.
APPLICATION FILED JUNE 18, 1908.

959,971.

Patented May 31, 1910.

2 SHEETS—SHEET 2.

Fig. 3—

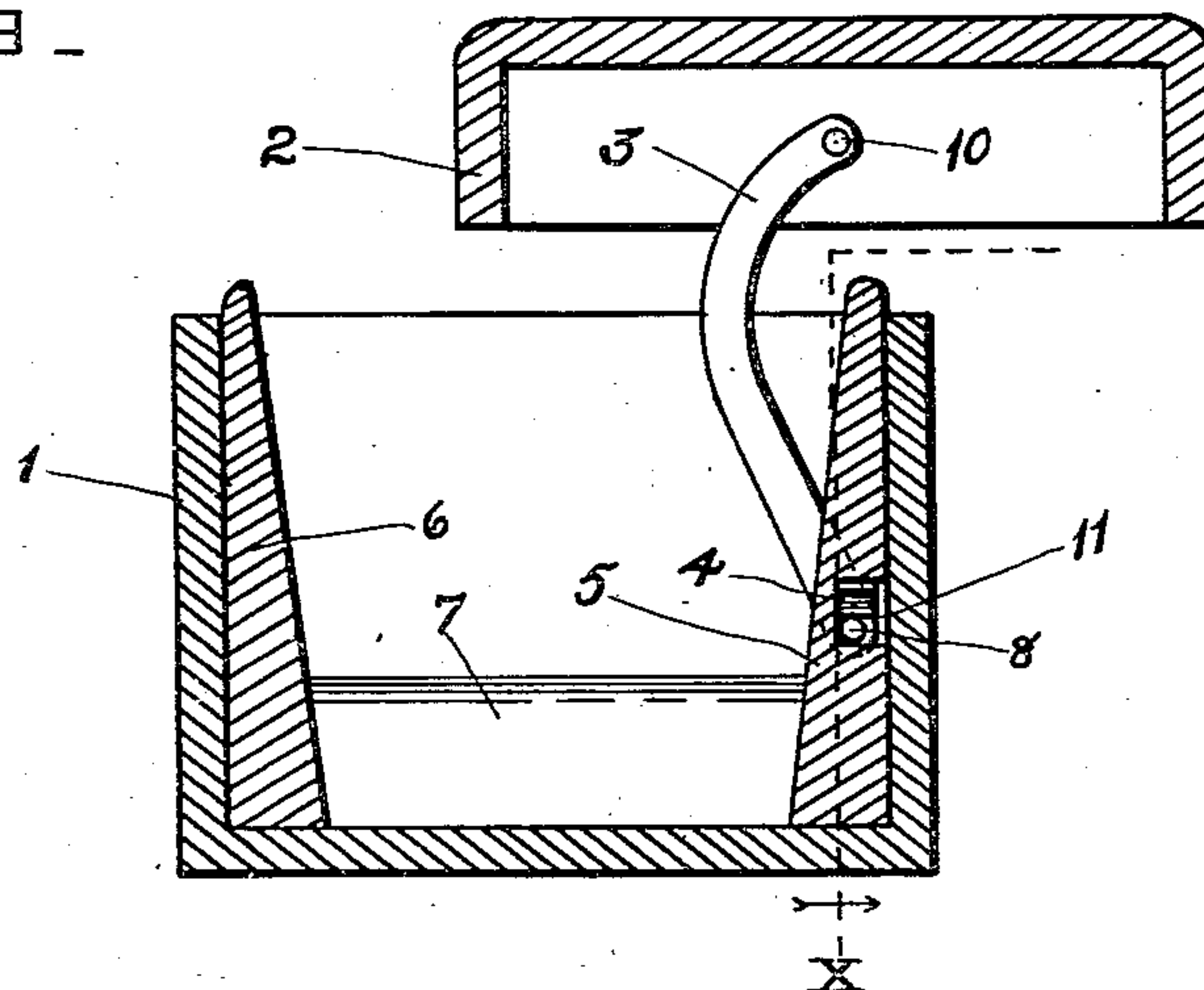


Fig. 5—

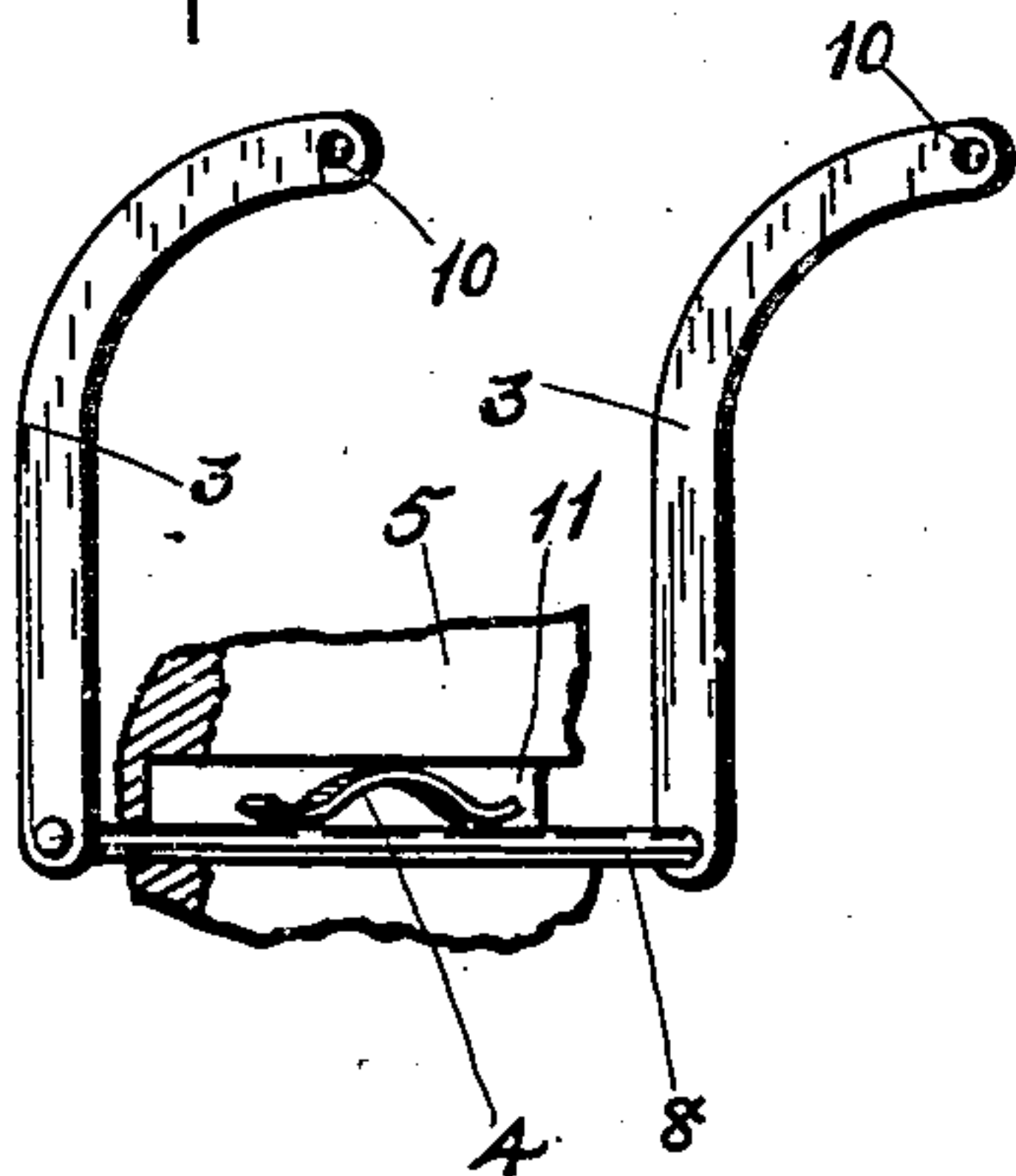
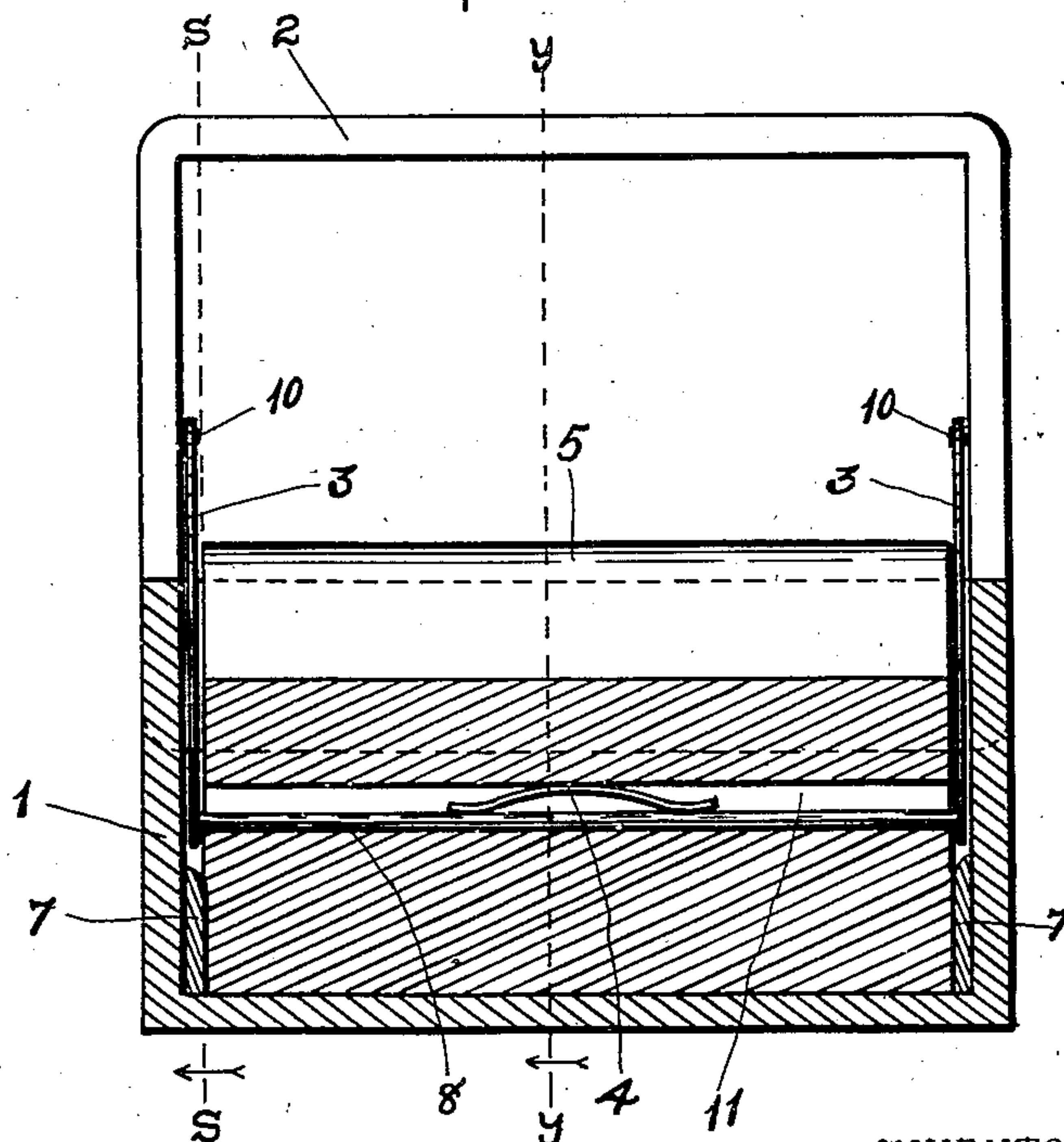


Fig. 4—



WITNESSES:
Charles W. Dake.

Mary S. Tooker

INVENTOR.

Fred W. Tobey

BY

Edward Taggart
ATTORNEY.

UNITED STATES PATENT OFFICE.

FRED W. TOBEY, OF GRAND RAPIDS, MICHIGAN.

HINGE AND LOCK FOR BOX-COVERS.

959,971.

Specification of Letters Patent.

Patented May 31, 1910.

Application filed June 18, 1908. Serial No. 439,241.

To all whom it may concern:

Be it known that I, FRED W. TOBEY, a citizen of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented new and useful Improvements in Hinges and Locks for Box-Covers, of which the following is a specification.

This invention relates to improvements in hinges and locks for box covers, and its object is to provide simple and efficient means for connecting a box and its hinged cover and for locking such cover in position through the operation of the hinge.

The device operates as a hinge without calling into operation all the parts shown and described; and it also, when complete, operates as a combined hinge and lock.

I design this invention to be applied to covered boxes of any size or shape. I have shown in the drawings a form of box designed especially for holding the cards of a card index and provided with the additional special parts adapting it for that purpose.

The ordinary box cover hinge applied upon the exterior surface may be a considerable blemish to the appearance of the box, and it is difficult to make the hinge and its attachments of sufficient strength to resist the strain caused by the weight of the cover when open, or the force that may be used in opening; and this is especially true of small boxes where small hinges and small screws must be used if the ordinary method is followed.

By my invention I produce a covered box having no hinge or other attachment whatever upon the external surface, one which will permit the cover to open within a small vertical space and one so strong that no force applied to the cover when it is open will affect or strain the hinge connection.

These objects I accomplish by the construction shown in the accompanying drawings, in which—

Figure 1 is a top plan view of the card index box with the cover swung to its extreme rearward open position, so that we look down into the open box, but see only what was the forward and is now the upper edge of the cover. Fig. 2 is a vertical section on line $s-s$ of Fig. 1, and Fig. 3 is a vertical section upon line $y-y$ of Fig. 1, but having the hinged cover in a different position. Fig. 4 is a longitudinal vertical

section on line $x-x$ of Figs. 2 and 3, and the lines $s-s$ and $y-y$ in Fig. 4 also indicate the planes upon which Figs. 2 and 3 are respectively taken. Fig. 5 is a detailed perspective of the hinge and spring.

In the drawings the numeral 1 represents the main body of the box having four sides and a bottom and 2 represents the hinged cover.

3, 3 are the bent or curved hinge arms connecting the box and the cover. At their upper ends these hinge arms are pivoted to the cover at its opposite ends by the pivots 10, 10. These points of attachment are spaced upon the cover as determined by the length and curve of the hinge arms, so as to bring the cover when open to the desired vertical position. At their lower end these hinge arms are connected by a rod or bar 8, the connection being either loose or rigid, as may be desired. The tops of the hinge arms being connected to the cover at opposite points, these arms must move equally and simultaneously whenever the cover is opened. This rod 8 lies horizontally along or near the inner surface of the rear side of the box, and is suitably held against unlimited vertical movement in either direction. It is desirable that slight vertical motion in one direction be permitted, and as the particular means of accomplishing this object in the construction shown, I have provided a horizontal groove in which this rod lies, which groove is wider than the rod, and therefore permits the latter to move up and down a short distance. This groove is indicated by the numeral 11. It is also desirable, in order to produce a snap lock effect, that there should be a spring or yielding resistance to the vertical motion of this rod, and in the form shown I have provided this effect by the flat tension spring 4, the upper convex portion of which rests against the upper surface of the groove, and the depressed ends of which rest upon the rod and normally press it down to the bottom of the groove. The vertical retaining means for the rod, being, in the form shown, the horizontal groove 11, may be provided at such point and in such manner as the form and size of the parts make appropriate. In this card index box I provide at the rear and front the usual blocks 5 and 6 straight upon their surfaces which contact with the inner box surface, and beveled upon their inner surfaces, as particularly indicated in Fig. 3.

These serve properly to hold the index cards so that the tops are easy of examination, and at the same time the rear block 5 furnishes a convenient location for the horizontal groove 11; and by making this block 5 slightly shorter than the block 6 and slightly shorter than necessary to fill the entire length of the box, there remains a free space at each end of the block 5 between the ends thereof and the adjacent box ends, within which space the hinge arms 3 may travel.

7 7 are blocks or projections upon the inner surface of the box ends and along the bottom thereof, serving to hold the contained cards against longitudinal motion in the box, and thus causing a free space also at each end of the cards, within which free space the hinge arms may travel and in this way preventing the cards from obstructing the swing of these arms.

In Fig. 2 the dotted lines indicate the positions taken by the parts when the cover is closed, and 9 indicates the cover when in this closed position.

In order to produce a snap lock effect for the cover, I provide upon the box front means for engaging the cover edge when closed, and as such means I have shown the front block 6 projecting upward above the edge of the box front, and rearwardly beveled. It is evident that by the construction shown, when the cover is opened it will first be raised somewhat and then will swing backward upon a nearly horizontal plane and then will swing upward into the position shown in Fig. 2. This permits a box where the vertical space is limited, as, for example, if it stands upon one shelf and below another, to have the cover open with economy of vertical space; and evidently by properly adjusting the length and curve, or angle, of the hinge arm and the points of attachment at each end, the cover may be given any desired motion of this general character, and when open may rest either higher or lower than the position shown in Fig. 2, even to the extent of bringing the rear edge down even with the box bottom. This opening motion and open position of the cover make the box less liable to tipping over, and, indeed, the open cover may prevent rather than facilitate the capsizing of the box, and no ordinary strain applied to the open cover can affect or weaken the hinge connection.

If it is desired to have a lock or stop connection between the box and cover when the cover is closed, I accomplish this very simply by the means shown in the drawing cooperating with the peculiar form of spring hinge at the rear of the cover. Such locking means consists of an upward projection from the top edge of the box front and carried on upwardly in substantially the plane of the

inside of the box front. Such projection may be vertical, as shown in Fig. 2 (and having, if desired, above the vertical portion a beveled corner), or it may be upon a curve or bevel for the entire distance, as shown in Fig. 3, but in either case, the projection must be forward of and outside the arc of the circle upon which the lower inside corner of the box cover front would normally swing if the point of pivotal attachment remains stationary. This means of engagement makes it necessary that the initial opening motion of the front of the box cover should be either precisely vertical or more nearly vertical than such arc of such circle, and makes it necessary also that the rear edge of the cover carrying the pivotal attachment should be permitted to rise in a vertical motion as far as the front edge of the cover is by this front engagement compelled to rise. To this end the groove 11 is made of about the same width as the distance which the block 6 projects above the front box edge. Thus, when a lifting force is applied to the front edge of the cover the first effect is that the entire cover, front and rear, lifts until the front cover edge is free from the stop or lock, and then a backward motion of the cover may commence and freely continue. When the spring is employed, giving a yielding motion to the hinges, it is evident that this first lifting motion, on opening the cover, will be against and must be sufficient to overcome the resistance of the spring, and that in the closing motion, when this same point is reached and the resistance of the spring is overcome sufficiently to permit the cover edge to pass the stop, the tension of the spring will pull the cover down front and rear and snap it shut. This provides in substance a snap lock sufficient to prevent accidental opening and holding the cover tight against dust and dirt. I prefer, also, to have the rear inserted block 5 project above the rear edge of the box, and by these two inserted blocks I thus provide, both at front and rear, flanges which not only serve to hold the cover in proper position, but also assist in making a tight joint.

I have shown the hinge arms of bent or curved form. This shape is essential in order to permit the cover completely to take the position shown in Fig. 2, and in order to cause the cover to move in the flattened arc in which the construction illustrated will cause it to move; but as to the remainder of the described operation of the parts this shape of the hinge arms is not essential.

With reference to the vertical motion of the cover before the opening, swinging motion begins, or after the closing, swinging motion is finished, it is obviously important that the relative vertical motion should be permitted by means of a vertical shifting at

the point of pivotal attachment between the hinge arm and box, or between hinge arm and cover, and that this vertical shifting may take place in any suitable manner within the limits of either one of the pivoted members. As the most convenient and simplest form now known to me, I have shown such vertical shifting taking place in the body of the box structure rather than in the body of the cover or hinge members.

Having thus described my invention, what I claim to have invented and desire to secure by Letters Patent, is—

1. The combination of a box, a cover, bent hinge arms pivotally connected to the cover and to the box, means for permitting vertical motion of the hinge arms at one of their points of attachment, means for limiting such vertical motion and a projection carried by the box front for removably engaging the front cover edge which projection extends upwardly in the plane of the box front far enough to prevent any initial swinging motion by the cover on its hinge.

2. The combination of a box, a cover, a bent hinge arm pivotally connected to the cover and to the box, means for permitting and for limiting vertical motion of the hinge arm at one of such points of attachment and yielding means for holding such hinge arm at one determined point and for returning the same thereto.

3. The combination of a box, a cover, a bent hinge arm pivotally connected to the cover structure at its upper end and to the box structure at its lower end, one of such structures being provided with an opening permitting and limiting vertical motion by the adjacent hinge arm pivotal connection.

4. The combination of a box, a cover, and bent hinge arms pivoted at their upper ends to the box cover and carrying at their lower ends a connecting rod, the box structure being provided with a horizontal groove permitting and limiting vertical motion by the hinge arm connecting rod.

5. The combination of a box, a cover, bent hinge arms pivoted to the cover and at

their lower ends united by a connecting rod, the box structure being provided with a horizontal groove permitting and limiting vertical motion by the connecting rod and spring means for resiliently holding the connecting rod at the desired normal position.

6. The combination of a box, a cover, bent hinge arms pivoted at their upper ends to the cover and at their lower ends carrying a connecting rod and an inserted rear block provided with a horizontal groove permitting and limiting vertical motion by the connecting rod.

7. The combination of a box, a cover, bent hinge arms pivoted at their upper ends to the cover and at their lower ends carrying a connecting rod, means carried by the box structure for permitting and limiting vertical motion by such connecting rod, spring means for normally holding such connecting rod at a determined position and for returning it thereto after removal, and vertically extending means carried by the box front for engagement with the front cover edge when such spring means is compressed.

8. The combination of a box, a cover, front and rear blocks inserted in the box and projecting vertically above the front and rear edges thereof, bent hinge arms pivoted at their upper ends to the box cover and at their lower ends carrying a connecting rod, the rear inserted block being provided with a horizontal groove permitting and limiting vertical motion by such connecting rod, and spring means for normally holding such connecting rod in its lower position and allowing the same to be lifted to permit the front cover edge to pass over the front block projection.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FRED W. TOBEY.

Witnesses:

MARY S. TOOKER,
MARY SCHULTE.