

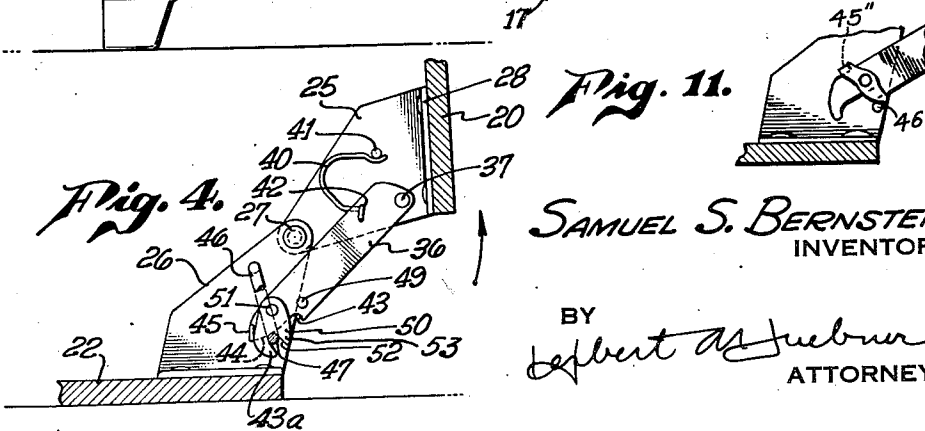
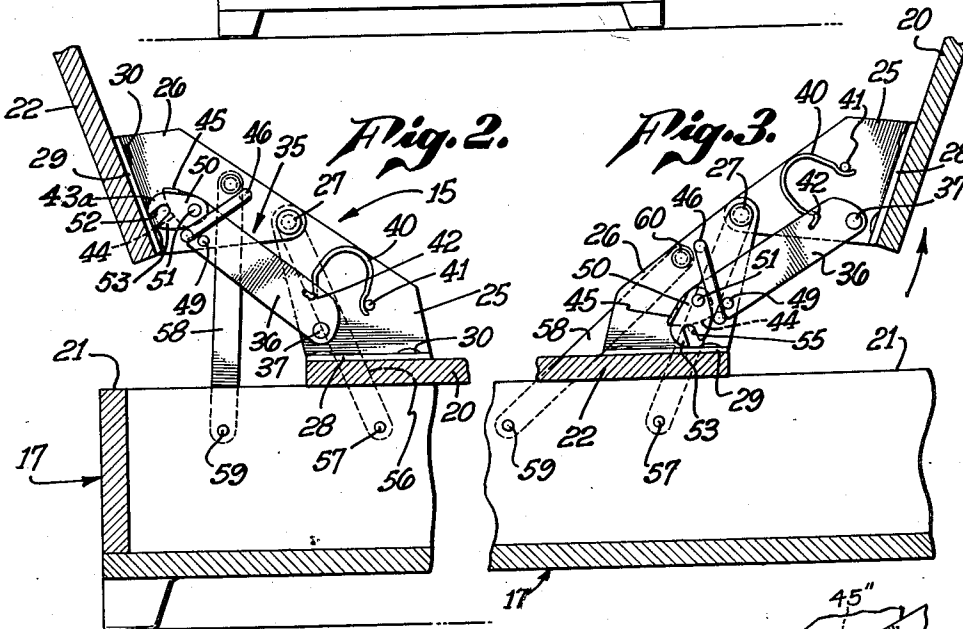
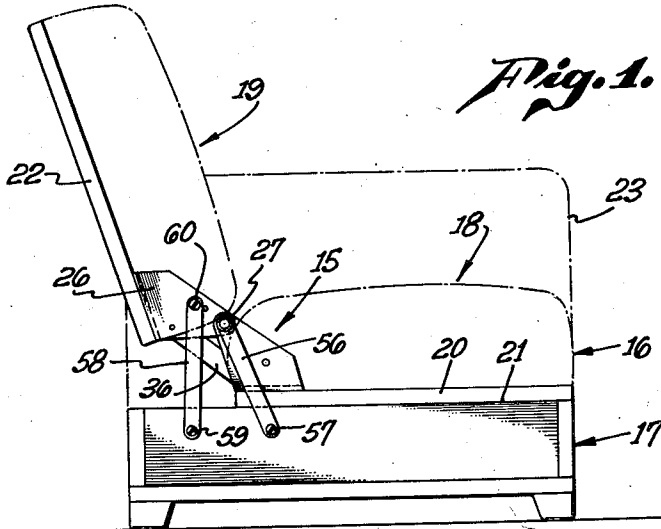
March 21, 1950

S. S. BERNSTEIN
POSITIVE LATCH CONTROLLED HINGE FOR
DAVENPORTS OR SOFA BEDS

2,501,464

Filed May 29, 1944

2 Sheets-Sheet 1



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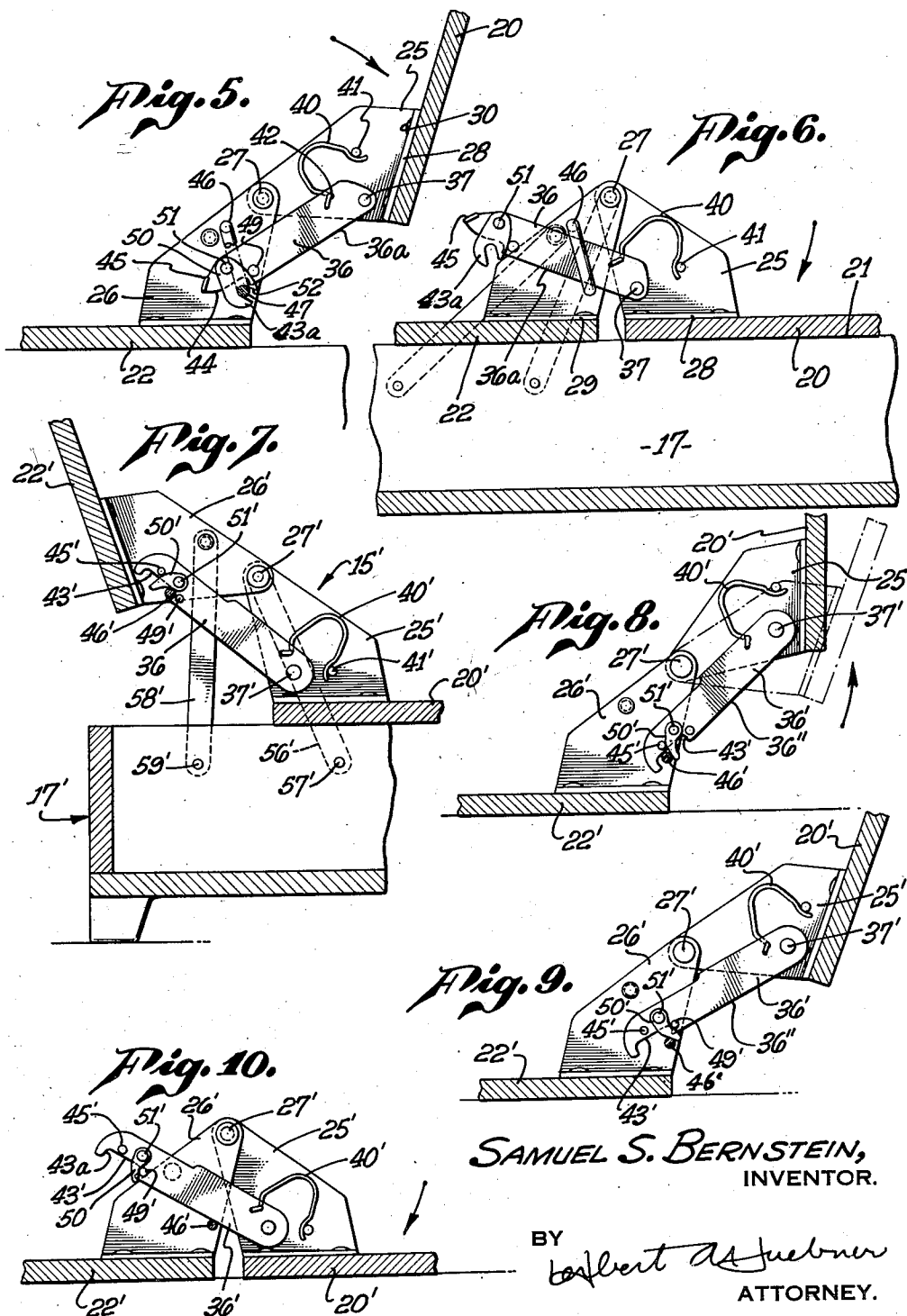
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UNITED STATES PATENT OFFICE

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POSITIVE LATCH CONTROLLED HINGE FOR
DAVENPORTS OR SOFA BEDS

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1 Claim. (Cl. 5-47)

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Davenport or similar articles of furniture which are convertible into beds utilize a hinge pivotally connecting the seat frame and back frame at each end, and are usually provided with a linkage establishing the correct coupling between such parts and the base of the davenport.

Conventionally, the hinge is of a type which will function enabling manipulation of the davenport as follows: Assuming that the davenport (such an article of furniture being used by way of example and not of limitation) is in normal position with the back elevated, a bed is formed by first grasping the seat portion and pivoting the seat and back as a unit by swinging the seat upwardly in an arc until the back rests horizontally upon the base of the davenport. A further slight elevation of the seat then releases the interlocking mechanism of the hinge by which the seat and back were normally retained in angled relationship, and the seat portion may then be lowered to rest upon the base, the seat and back thus resting upon the base in the same plane and immediately adjacent. When the article of furniture is to be restored to the form of a davenport, the seat portion is again elevated to reestablish the latched condition of the hinge whereby the seat and back are secured in angled relationship, and the seat portion is then swung down upon the base which automatically elevates the back into normal davenport position.

Suitable hinges now in use depend upon gravity actuated elements for latching and unlatching the hinge to operate it. As the weight of the gravity actuated elements is relatively slight, rust on the hinge elements, or the presence of cloth threads or pieces, tufts of cotton or other fibrous material, lint, or dirt, or any other adhering foreign substance, even paint, which may foul the operating elements will prevent the hinge from functioning as intended. Such frequently occurs, and renders it impossible sometimes to convert the davenport into a bed and sometimes to change the bed back into a davenport. Inasmuch as in properly finished davenports the hinges are concealed by upholstery and practically inaccessible, such inoperativeness of the hinges is not only annoying but renders the furniture useless until a repair man can remove the obstructing material from the hinges.

It is an object of my invention to provide a hinge construction for the purposes specified in which the operating elements for latching and unlatching the hinge in its respective positions are actuated by positive mechanical means independently of gravity.

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More particularly it is an object of my invention to provide an improvement in a hinge of the character described which embodies a latch bar between the leaves or plates of the hinge formed with a notch for engagement with or disengagement from a pin or stop in the operation of the hinge, the improvement being characterized by a control device operated by a positive cam action while engaging or disengaging the latch bar with or from the pin or stop.

A further object of my invention is to provide an improvement in hinges of the character described which is no more expensive to manufacture than conventional hinges intended for the same purposes, and in which the mechanical elements which characterize the improvement are interchangeable with elements of conventional type, in other words, may be substituted for such conventional elements to convert a conventional hinge into one utilizing my improvement.

A still further object of my invention is to provide a smoother operating latching mechanism than is afforded by the devices of the prior art.

These and other objects of my invention will become further apparent from a consideration of the description which follows taken in conjunction with the drawings.

In the drawings:

Figure 1 is an end elevation with the upholstery cover removed of a davenport construction utilizing my improved hinge.

Figure 2 is an enlarged fragmentary section at the opposite end of the davenport illustrating the hinge parts in position to sustain the davenport back in normal davenport position.

Figure 3 is a similar sectional view illustrating the first step of converting the davenport into a bed.

Figure 4 illustrates a further manipulation to accomplish this purpose.

Figure 5 illustrates downward movement of the seat after the hinge latch has been released.

Figure 6 illustrates the back and seat resting on the base in the same plane for bed position.

Figure 7 is a fragmentary section similar to Figure 2 of a modified form of my invention.

Figures 8, 9 and 10 are similar sectional views of the modified form illustrating successive steps of converting the davenport into a bed.

Figure 11 is a detail view of the lower end of the latch bar, showing a modified construction of the pawl.

The first form of my improved hinge is illustrated in Figure 1 and is illustrated in connection with a davenport 16, the upholstery

of which is outlined in broken lines. The davenport comprises essentially a base 17 of any conventional or otherwise suitable construction supporting a seat 18 which in turn through the agency of a pair of my hinges 15 sustains a back 19. The seat 18 includes a frame element 20 which normally rests flat upon the upper surface 21 of the base 17, and the back 19 includes a frame element 22. These frame elements 20 and 22 of the seat and back respectively may be suitably upholstered in any conventional or desirable manner, and the davenport may include upholstered ends or arm rests 23. The construction of the davenport itself is not a part of my invention, but one form of such davenport is here illustrated as described for the purpose of illustrating the environment of my invention.

One of my hinges 15 is employed at each end of the davenport (or at each side of a chair if used on a chair which can be converted into a bed). The hinges at opposite ends (or sides) will be right and left hand respectively to accommodate their respective positions of installation. Whether right or left hand merely involves the placing of the operating movable parts of the hinge control to be located on the inside face of the hinge as installed, which is usually on the same side of the hinge plates as the mounting flanges. This is an inconsequential detail as far as the spirit of my invention is concerned, such location of the moving parts being for the purpose of maintaining the opposite sides of the hinge plates clear for the operation of conventional linkages between the hinge and the base of the davenport. The hinge shown in Figure 1 is at the near end of the davenport and is therefore viewed from outside, the upholstering cover being removed. The hinge illustrated in Figures 2 to 6 is the one located at the opposite end of the davenport and is therefore viewed from the inside.

My hinge 15 comprises complementary plates 25 and 26, being flat members of any suitable design but preferably tapered as illustrated, overlapping at the end region of the taper and pivotally united at such overlapping portion by a pintle 27. Each plate is formed with a right angle mounting flange 28 and 29, respectively, used for securing the plates to the seat frame 20 and back frame 22, respectively, by means of screws 30. These mounting flanges are not essential to the invention, as the plates may be secured upon the frames by other means if desired.

I provide a latching mechanism 35 between the two hinge plates. This mechanism includes a latch bar 36 pivotally mounted at 37 on the plate 25 near the base end thereof and extendable over the face of the plate 26. In the illustrated positions of use and operation which are usual this latch bar 36 will settle by gravity into the required latching position and is long enough and heavy enough to so function. However, an auxiliary horseshoe spring 40 may be employed to supplement the gravity action. This spring 40 is anchored at one end on the plate 25 by means of a pin 41 on the plate, and at its other end is inserted through a hole 42 in the latch bar 36.

The latch bar 36 is formed with a notch 43 which merges into a curved end portion 44, and the extreme end of the latch bar is formed with a stop lug 45. Some other form of stop may be substituted for the lug 45.

The latch bar 36 is adapted to engage with

a stop 46 rigidly mounted on the hinge plate 26. As illustrated, this stop 46 is in the form of a C-shaped guard but the primary function of the stop 46 is provided by a short leg 47 extending at a right angle from the plate 26. It is this leg 47 which the notch 43 and the surface 44 engages, and a simple pin, a shouldered rivet, a lug or ear struck from the latch bar itself, or any other similar or suitable stop device may be employed in lieu of the guard form 46.

Pivotally mounted on the latch bar 36 near the free end thereof is a control pawl 50 having its pivotal mounting at 51. The pivot 51 is preferably located between the notch 43 and the stop 45 and somewhat above these other elements. The pawl 50 is formed with a slot 52 open at one end and of a size to be engageable with and disengageable from the leg 47 of the stop 46. A part of the control pawl forms a cam finger 53 functioning as hereinafter described. The stop 45 extends across the plane of the pawl 50 for engaging the same; and a stop 49 on the latch bar limits the pawl 50 at its opposite extreme of movement.

Conventional linkages are employed with my improved hinge as follows: A link 56 pivotally mounted at its lower end at 57 on the base 17 is pivotally mounted at its upper end on the pintle 27 of the hinge. A second link 58 is pivotally mounted at its lower end at 59 on the base 17 and at its upper end at 60 on the plate 26 of the hinge. This linkage 56 and 58 is for the purpose of controlling the relationship between the base, the seat, and the back in accordance with principles well known in the art.

In the operation of this form of the invention it is assumed that the respective parts of the davenport are positioned as illustrated in Figures 1 and 2 which is the normal arrangement. In this position, the frame 20 of the seat is resting flat upon the platform 21 of the base 17, and the back frame 22 is supported in upright position by the notch 43 in the latch bar 36 engaging the stop 46 on the hinge plate 26.

For shifting the parts to convert the davenport into a bed, the seat frame 20 is elevated to the position shown in Figure 3, whereupon the back frame 22 lowers by gravity until the frame 22 rests upon the platform 21. With the notch 43 engaging the stop 46, the hinge plates are held open and the seat cannot be lowered into the same plane as the lowered back. In order to disengage the notches from the stop, the seat frame 20 is swung slightly beyond the point necessary to rest the back upon the platform, into the position shown in Figure 4. This action pulls the latch bar 36 upwardly and forces the pawl 50 to ride up over the stop 46 with a cam action due to the fact that the opposite edge of the pawl is stopped against the element 45. This operation elevates the notch end of the latch bar 36 disengaging the notch 43 from the stop 46, and after the disengagement has sufficiently progressed, the pawl 50 has moved to the point where the open slot 52 coincides with the position of the stop 46 permitting the pawl 50 to drop down upon the stop as shown in Figure 4.

Reverse movement of the seat, that is to say a lowering of the same, will then effect an operation of the latching mechanism as follows: the pawl 50 being supported by the stop 46 and pivotally connected to the latch bar 36 elevates the latter when the pawl pivots into the position shown in Figure 5, the swinging of the pawl stopping upon contact of the pawl with the stop

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49 on the latch bar. The latch bar is retained in an elevated position until the notch 43 has passed over the stop 46 whereupon the pawl 50 slips off of the stop 46, and the lower edge 36a of the latch bar rides upon the stop to the position shown in Figure 6 wherein the seat rests upon the platform 21 in the same plane as the back, whereby the furniture is converted into a bed.

In changing the furniture from a bed back into a davenport the seat is first elevated to a sharp angle to the back, as for example in Figure 3, whereupon the notch 43 engages the stop 46, and thereupon the seat may be lowered upon the base thereby forcing the back to swing up into position shown in Figures 1 and 2.

It will be noted that the action of the pawl 50 is not dependent upon gravity, the pawl being positively forced by action of its co-related or associated parts into its different operating positions. I have found by test that this improved mechanism will not fail to operate even when for purposes of demonstration the pawl is fouled with threads, fabric or other foreign material of the character which causes the present conventional devices to become non-operative as set forth in the earlier part of this specification. In other words, my control operation is a forced push and pull action.

In the alternative form of the invention illustrated in Figures 7 to 10, my hinge 15' comprises hinge plates 25' and 26' pivotally connected by pintle 27' in the same manner as in the first described form. Other elements not specifically redescribed are obviously the same, as appears by the drawings, and the description of the first form of the invention.

The difference in the two forms resides in the details of the positive latch control, although the principle of operation is the same in both forms and I deem one to be an equivalent of the other. In this alternative form I provide a latch bar 36' pivotally mounted at 37' upon the plate 25'. In the end of the link opposite the pivot 37' is an elongated notch 43' for engagement with a stop pin or lug 46', the latter being secured in and extending from the plate 26'. A pawl in the form of a finger 50' is pivoted at 51' upon the latch bar 36' and is limited in its rotational movement by oppositely disposed stop pins 45' and 49'.

In operating this form of the invention, the same sequence of movements is employed as in operating the first described form. When the seat is elevated to the position shown in full lines in Figure 8, the concave edge of the pawl 50' rides over the pin 46' elevating the end of the latch bar 36', and after the end of the pawl 50' passes over the pin the latch bar drops so that a different portion of the elongated notch 43' receives the pin 46'; then upon lowering of the seat and consequent swinging of the hinge the convex edge of the pawl 50' acts as a cam to engage the pin 46' thereby elevating the latch bar so that the notch will completely clear the pin, and the lower edge 36'' will slide upon it, a sequence illustrated in Figures 9 and 10.

From the foregoing description, the reverse operation to shift the bed back into the form of a davenport should be obvious. Briefly, the seat is swung upwardly which slides the latch bar 35' over the pin 46' until the notch 43' drops over the pin 46' and the consequent lowering of the seat automatically elevates the back.

In this second form of the invention the action of the control latch mechanism is also positive

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and independent of gravity, the several movements of the pawl 50' being positively actuated by mechanical force in the manner described.

An important feature of my invention is the smoothness and ease of operation over prior art devices. The contour of the cam surfaces of the pawl 50 (or 50') and its pivotal mounting above the notch in the latch bar combine to afford a mechanical advantage in favor of the person operating the hinge whereby a very slight pressure on the hinge plate in the right direction will cause the pawl to shift, or to ride up over the stop 46 (or 46') for releasing the latch bar. This functional improvement is dependent to a considerable extent on the positive control of the position of the pawl, the latter being rotated to either one of its two extremes by direct thrust against the stop 46 (or 46'), which thrust is positively applied by the operator in moving the seat of the davenport as described. Also the limit stops 45 and 49 (45' and 49') positively stop the pawl at the extremes of movement whereby the cam surface of the pawl cannot further yield but must ride over the stop 46 (or 46'). In the first form, the stop 45 in connection with the slot of the pawl 50 prevents the latch bar from being pulled entirely away from the stop 46. In the second form, the hook 43a at the outer end of the elongated slot 43' performs such functions. In both forms, the action is such that an audible click is heard when the pawl completes its function in either direction, thus informing the user that the hinge is conditioned for the desired operation.

Although I have herein shown and described my invention in what I have conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of my invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent structures. As examples, other means than the limit stops 45 and 49 (45' and 49') might be employed. Thus, equivalent stops 45'' might be located on the pawl itself positioned to engage the edge of the latch bar at the extreme positions of the pawl, see Fig. 11. Projections of suitable form mounted on the latch bar would be equivalent to the notches 43 (or 43') shown and described, and the term "notches" as employed in the claim is intended to include such a variation. Equivalent reversal of any of the parts, or a change of form, may be employed within the essence of my invention.

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

A hinge for use with a davenport bed having a base, a seat frame and a back frame comprising: a pair of plate members, one end of each plate member carrying a mounting flange, the opposite ends of said plate members being pivotally connected; a latch bar having one end pivotally connected to one of the plate members adjacent its mounting flange, said latch bar having a lower edge provided with a notch adjacent the free end of the latch bar, said notch terminating at front and rear shoulders; a stationary lock bar carried by the other of said plate members and arranged to be received in said notch; a finger pawl provided with a rearward, concave edge and a convex front edge, pivotally connected to the latch bar adjacent the notch therein; a pair of spaced lugs carried by the latch bar adjacent the pawl for limiting pivotal movement of the pawl

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between a frontal position wherein the finger pawl is in contact with one of the stop lugs and extends beyond the notch with the front and rear pawl edges in spaced relation to the front and rear shoulders of the notch, and a position in contact with said other lug wherein the finger pawl extends rearwardly beyond the notch and covers the rear shoulder of the notch to cam said latch bar out of engagement with the lock bar; and spring means biasing the latch bar downwardly against the stationary lock bar whereby the plates are locked against pivotal movement in one direction when the lock bar is in the notch and bears against the rear shoulder thereof, said plates being arranged to be unlocked by restricted pivotal movement of the plates in an opposite direction, said finger pawl in its frontal position translating such opposite pivotal movement into movement of the latch bar whereby the lock bar extends into the notch between the front shoulder thereof and the front edge of the pawl, said front edge of the pawl guiding the lock bar into the lower edge of the latch bar when the pawl is in the rearward position.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
696,671	Gay	Apr. 1, 1902
820,826	Seng	May 15, 1906
835,179	Crouch	Nov. 6, 1906
1,140,852	Roeder	May 25, 1915
2,224,825	Krakauer et al.	Dec. 10, 1940
2,295,083	Jonassen	Sept. 8, 1942
2,317,105	Neunherz	Apr. 20, 1943
2,341,616	Hoffman	Feb. 15, 1944
2,343,642	Burton	Mar. 7, 1944

FOREIGN PATENTS

Number	Country	Date
181,302	Great Britain	May 29, 1922