

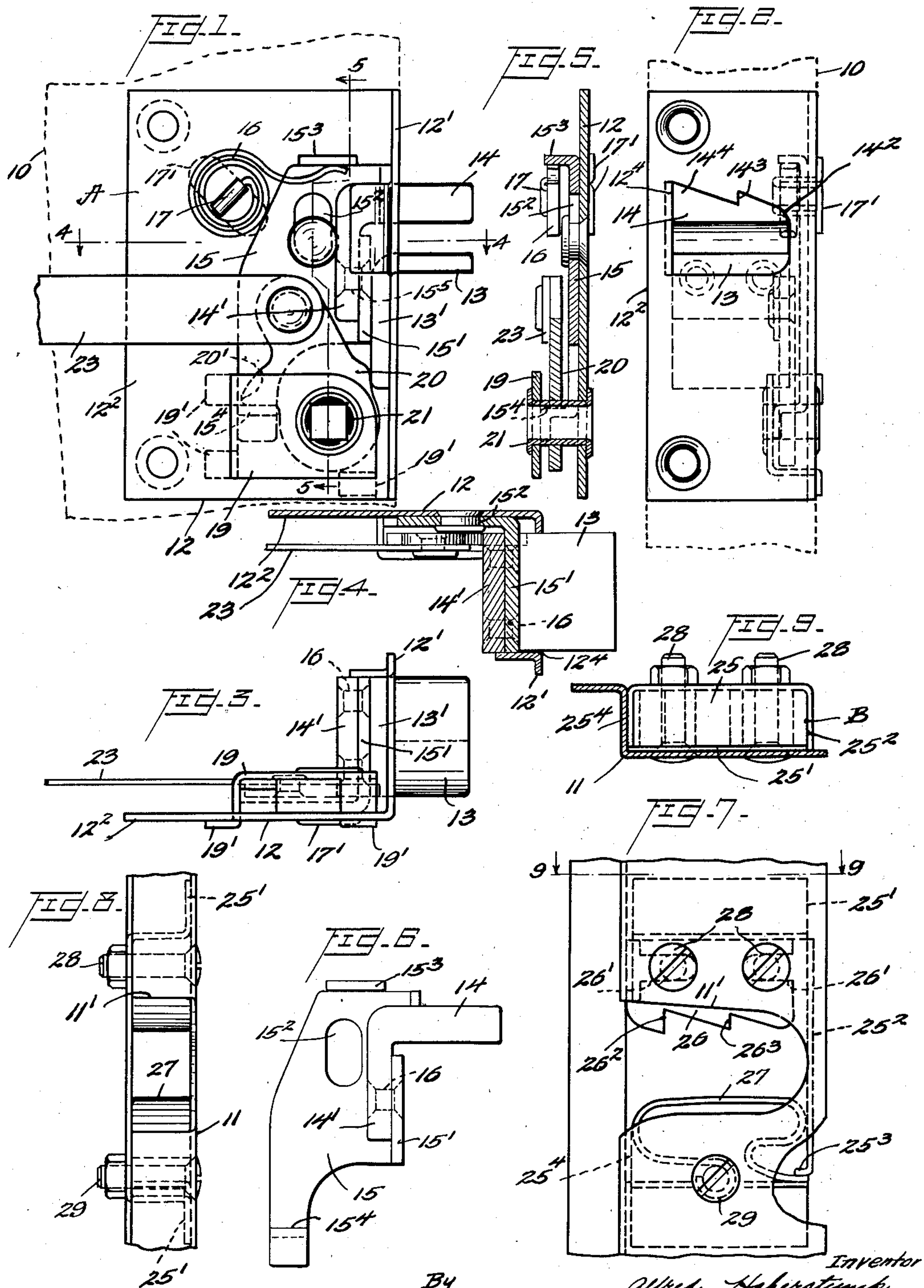
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A. HABERSTUMP

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COMBINED DOOR LOCK AND RETAINER

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By

Alfred Haberstump,  
Attorney at Law,  
St. Louis, Mo.  
JH:ys



## UNITED STATES PATENT OFFICE

ALFRED HABERSTUMP, OF DETROIT, MICHIGAN

## COMBINED DOOR LOCK AND RETAINER

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The present invention relates to latches for doors, particularly vehicle doors, as for instance the passenger doors of automobiles and trucks.

5 It has generally heretofore been considered necessary to provide an automobile door not only with means for releasably securing the same in closed position, i. e., a suitable latch, but also with separate means  
10 for supporting the door relatively to the frame, when in closed position, at a point remote from the hinges. The door supporting means now and heretofore in practically universal use comprises essentially a  
15 tongue or flange rigid with the door, which is received between two opposed resilient members secured to the door frame when the door is closed. This support relieves, to a large extent, the door hinges from the  
20 weight of the door when the door is closed, prevents rattling of the door relatively to the frame, and in general holds the door in its correct theoretical position relative to the frame regardless of the ordinary small  
25 distortions to which the body of the car is subject.

In accordance with the present invention, the latch and support are combined into one structure which performs the functions of  
30 both, thus facilitating manufacture and reducing the number of operations which must be performed in assembling the lock and support with the door structure and lowering the cost by the elimination of certain parts and certain assembling opera-  
35 tions. Furthermore, by means of the improved construction, door opening and closing operations are rendered easier, less noisy, and more dependable.

40 A feature of the present invention, furthermore, is the provision of resilient members, or a resilient member, of metal to form part of the door support, eliminating the use of rubber blocks with their various  
45 attendant disadvantages. Many other advantageous features of the invention will be observed by one skilled in the art, and possible modifications to fit varying conditions of use, the invention not being limited  
50 to that form hereinafter described in detail

and shown in the accompanying drawing by way of example.

In the drawing:—

Figure 1 is a side elevation of that portion of the mechanism which supports the latch bolt, i. e., the portion which is secured to the swinging door, a fragment of the door being illustrated in dotted lines; 55

Figure 2 is an end elevation of the same;

Figure 3 is a top plan view; 60

Figure 4 is a section on line 4—4 of Figure 1;

Figure 5 is a section on line 5—5 of Figure 1;

Figure 6 is a side elevation of the sliding plate to which the latch bolt is secured; 65

Figure 7 is a side elevation of a portion of a door frame pillar cover panel, showing the improved catch and support affixed thereto; 70

Figure 8 is an end view of the same; and

Figure 9 is a section on line 9—9 of Figure 7.

A portion of a door is indicated at 10 in Figures 1 and 2, and the door frame pillar cover panel at 11. The portion of the device which carries the latch is indicated generally at A, and the letter B indicates generally that portion of the device which houses the catch and the support. The plate 12 is adapted to be secured to the edge of the door remote from the hinges, in the usual manner, the portion 12' of this plate being intended to lie flush with the edge surface of the door, and portion 12<sup>2</sup> to lie flush with the side surface. The plate is secured firmly in position by screws, bolts, or any other suitable means. 80 85

Projecting laterally from the latch supporting means A is a tongue 13, this member being horizontally disposed when the door is hinged to swing about a vertical axis. Member 13 has a vertically disposed portion 13' which lies closely against portion 12' of the plate 12, on the inside of this plate, and which is secured to the plate rigidly, preferably by a welding operation. Disposed parallel to the tongue 13 and immediately above the same is the latch bolt 14, this latch bolt also having a down-turned 90 95



portion indicated at 14' which is rigidly secured to a flange struck up from and integral with a sliding plate 15. The latch bolt may be welded to this flange, which is indicated at 15', or may be secured thereto by rivets, such as indicated at 30. Both the tongue 13 and the latch bolt 14 project laterally through an aperture, indicated at 12', formed in the portion 12' of plate 12, and the upper edge of this aperture constitutes a limiting stop for the upward movement of the latch bolt 14, the latch bolt being movable vertically from the position in which it is shown in Figures 1 and 2 to a position in which its lower face is in contact with the upper face of tongue 13, the tongue 13 constituting its lower limiting stop.

The sliding plate 15 is irregular in shape, as can be more clearly seen upon an inspection of Figure 6, and is adapted to be moved downwardly by manually applied force to effect release of the latch and opening of the door, and to be automatically moved upwardly by means of a spring 16 secured to plate 12 by means of a clip 17 within which one end of the spring is secured. The clip itself comprises a metallic member having a loop within the plate 12 to receive the end of spring 16 and outwardly projecting portions 17' comprising tabs which are bent over to lie flat against the portion 12' of the plate 12.

The free end of spring 16 bears against a flange 15<sup>3</sup> projecting horizontally from plate 15 at its upper edge, and the action of the spring is such that plate 15, together with latch bolt 14, normally occupies the position in which it is shown in Figure 1. In its vertical movements the plate is caused to follow a predetermined path, being confined by means of a stud secured to plate 12 and lying in a slot 15<sup>2</sup> formed in the plate. The lower end of plate 15 is likewise slidably confined by a retainer plate 19. This retainer plate is permanently secured to plate 12, having three portions 19', or tabs, which extend through slots in plate 12 and are bent over to lock the retainer plate in position. The lower end of plate 15 slidably rests against the rear wall of the retainer plate 19.

Downward movement of the slide 15 and latch bolt 14 is effected by means of a cam 20 fixed to a sleeve 21, which sleeve is rotatably supported at one end in the retainer plate 19 and at the other end in the main plate 12. The sleeve is apertured to receive, with a close fit, the square shank of a door handle of customary type, which is not illustrated. Rotation of the door handle in the usual manner, however, effects rotation of the sleeve 21 and rocking movement of the cam 20. In Figure 1 of the drawing the cam is shown in the position which it normally occupies when the door is closed and latched. To its upper end is pivotally con-

nected a link 23, and the opposite end of this link may be conveniently connected to a second operating handle, such for instance as a handle positioned interiorly of the door for the convenience of occupants of the vehicle.

By either such operating means, however, the cam 20 may be rocked in a counter-clockwise direction (Figure 1) and the projection 20' thereof caused to act upon a lateral projection 15<sup>4</sup> of sliding plate 15. In such rocking movement, therefore, the sliding plate 15 is depressed against the action of spring 16, and the latch bolt is brought down to a position in contact with, or very close to, the tongue 13. Upon release of the operating handle, the spring 16 acts to return the plate to the position shown in Figure 1. Movement of cam 20 in a clockwise direction may be limited by contact of the cam with the lower portion of member 13', as shown in Figure 1.

The upper surface of the latch bolt 14 is provided with a rounded portion 14<sup>2</sup>, which may be designated the forward portion inasmuch as it is the first to strike the catch in the closing movement of the door, and also provided with a tooth 14<sup>3</sup> midway of the width of the bolt and on its upper side, which tooth may be designated a safety catch which serves to hold the door in the event that its closing impetus is not sufficiently strong to secure engagement of the main locking tooth 14<sup>4</sup> with the main tooth of the catch on the door frame.

The door frame may be of any suitable construction or material, and in the present instance a metal pillar cover panel 11 is illustrated, this panel being cut away at 11' to provide a recess to receive both the latch bolt 14 and the tongue 13 when the door is in closed or partially closed position. In rear of the aperture 11' is secured a box or housing 25 having end flanges 25' secured to the panel, preferably by welding, and a rear flange 25<sup>2</sup> turned forwardly to meet the panel 11, the lower end of flange 25' having an intumed laterally extending flange 25<sup>3</sup>, as shown in Figure 7. The flange 25<sup>4</sup> of the retainer box has its mid-portion cut away to receive the latch bolt 14 and tongue 13, the cut-away portion being co-extensive in width with the cut-away portion 11' of the cover panel 11.

Within the retainer box or housing are positioned the catch 26 and the resilient door support 27. The catch 26 is preferably formed of hardened metal and is secured in position by means of screw bolts 28 which pass through slots 26' in the catch. By loosening the screw bolts, the catch may be adjusted inwardly or outwardly of the door frame. The door support 27 comprises a resilient spring formed as shown in Figure 7 of the drawing, the rear end of the spring projecting beneath flange 25<sup>3</sup> and be-



ing retained in the position shown by this flange. The forward end of the spring is looped, and passing through this looped portion is a screw bolt 29. Removal of this screw bolt renders it possible to easily remove the spring 27, which is highly advantageous inasmuch as the spring is subjected to considerable wear and may occasionally require replacement, as do the rubber blocks now in common use. If desired, the spring 27 may be replaced by a rubber block, but the spring is to be preferred inasmuch as it maintains its full resiliency for longer periods of time and is not deteriorated by heat, thus making it entirely practical to assemble the resilient member in position prior to the painting or enameling of the body, which operation generally involves passage of the body through a heated oven.

In the closing of the door to which the improved combination lock and support is applied, and assuming that the cam 20 is not operated by either of the operating handles, the tongue 13 will strike the forward edge of spring 27 practically at the same time that the rounded nose 14<sup>2</sup> of the latch bolt 14 strikes the rounded forward end of the catch 26. Due to the shape of the contacting faces of the catch and latch bolt, the latch bolt will be downwardly deflected so that the tooth 14<sup>3</sup> of the latch bolt will pass to the rear of the first tooth 26<sup>2</sup> of the catch. If a sufficient impetus has not been given the door to effect complete closing, the teeth 14<sup>3</sup> and 26<sup>2</sup> will remain in engagement, thus locking the door in nearly closed position.

If a sufficient impetus has, however, been given the door, the tooth 14<sup>3</sup> of the latch bolt will pass beyond and lockingly engage the tooth 26<sup>3</sup> of the catch, and the tooth 14<sup>4</sup> of the latch bolt will lockingly engage the tooth 26<sup>2</sup> of the catch. The door is then in fully latched position, and in such position the lower surface of the tongue 13 has full contact with the upper surface of the resilient supporting spring 27.

Not only is the door securely latched, but it is in part resiliently supported, the weight of the door being taken, to a considerable extent, off of the hinges and transferred to the door frame through the resilient support 27. Upon operation of either operating handle and actuation of cam 20, the latch bolt will be drawn downwardly and the teeth on its upper surface totally disengaged from the teeth of catch 26. The door may be opened, therefore, by a slight push.

If wear occurs between the edge of the door and the door frame, or between the latch bolt and the catch, the catch 26 may be laterally adjusted slightly to compensate so that there will never be at any time any rattling of the door laterally by reason of wearing of the parts. As the weight of the door

is transmitted to the frame through the resilient spring 27, and inasmuch as the spring 16 is always active, when the door is in closed position, to press the latch upwardly against the catch and the tongue 13 downwardly on spring 27, no rattling of the door relatively to the frame in a vertical plane can occur.

The invention provides, therefore, a mechanism by means of which all of the requirements heretofore imposed upon articles of this kind can be met and in addition has many further advantages. Thus, by combining the latching mechanism with the door supporting mechanism, heretofore formed separately and designated "dovetails", the cost of original manufacture and the cost of installation of the parts are greatly reduced. The latch bolt, being always projected from the door frame, is always in operative position unless, of course, it should for any reason stick in its lowermost position. Being visible and accessible from the outside, however, such sticking can be readily detected and overcome. The use of rubber blocks is preferably avoided, and the parts may therefore be completely assembled with the body prior to painting, with no danger of deterioration thereof by reason of heat used in paint drying processes.

By the consolidation of the latch and door support in a single mechanism, simplicity of construction and application of the lock to a door and door frame is promoted, and the final appearance of the assembly is neater and more attractive than those generally heretofore employed. The retainer box, bridging as it does the gap formed in the pillar cover panel for the reception of the latch bolt and tongue, reinforces the cover panel at the point where it has been weakened and results in a very strong construction.

Other advantages will be apparent to one skilled in the art, and it will furthermore be appreciated that, in adapting the invention to various types of locks and various types of vehicles, the design and arrangement of the component elements thereof may be varied very considerably without departure from the spirit and scope of the invention.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In combination, a device adapted to be attached to a door frame and having two spaced mutually facing elements, one comprising a catch and the other a support, and means adapted to be attached to a door to cooperate with said device in locking and supporting the door when in closed position, said means comprising two members, one a latch bolt and the second a tongue, said members being relatively movable toward and away from each other, and resilient means



normally urging said members apart, said members contacting with the spaced elements, respectively, of said device when the door is moved toward closed position and being thereby caused to approach each other against the action of said resilient means to permit entrance of said members simultaneously into the space between said elements, the tongue resting on the supporting element and said resilient means serving to hold the latch bolt in locking engagement with said catch to thereby hold the door in closed position.

2. In combination, a device attached to a door frame and having two spaced mutually facing elements, one comprising a catch and the other a support, and means attached to a door to cooperate with said device in locking and supporting the door when in closed position, said means comprising two members, one a tongue rigid with the door and the second a latch bolt bodily movable toward or away from said tongue, and resilient means normally urging said latch bolt away from the tongue, said members contacting, respectively, with the spaced elements of said device when the door is moved toward closed position and the latch bolt being thereby caused to approach the tongue, against the action of said resilient means, to permit entry of said members simultaneously into the space between said elements, the tongue resting on the supporting element and the resilient means serving to hold the latch bolt in locking engagement with the latch and thereby secure the door in closed position.

3. The combination with a door and door frame of a door lock and support comprising a catch and support mounted on the frame in fixed spaced relationship with an open space therebetween, and a latch bolt, tongue, and resilient means mounted on the door, the tongue being rigid with the door and the latch bolt movable bodily toward and away from the tongue, the resilient means normally resisting movement of the latch bolt toward the tongue, said members contacting, respectively, with the spaced elements of said device when the door is moved toward closed position and the latch bolt being thereby caused to approach the tongue, against the action of said resilient means, to permit entry of said members simultaneously into the space between said elements, the tongue resting on the supporting element and the resilient means serving to hold the latch bolt in locking engagement with the latch and thereby secure the door in closed position.

4. For use in a combined locking and supporting means for doors, means adapted to be rigidly secured to a door frame, said means having mutually facing catch and support members, the support member com-

prising a resilient spring having a curved portion at one end, and a member detachably secured to said means and engaging the curved portion of said spring, removal of said member permitting removal of the spring.

5. The combination with door and door frame members, the door frame member being fabricated of sheet metal and having a recess formed therein, a latch bolt on the door adapted to enter the said recess when the door is in closed position, a metallic retainer box bridging the recess formed in the door frame member and welded to said frame member at points on opposite sides of said recess, and a catch in said retainer box.

6. In a combined lock and support for doors, the combination with a latch bolt and tongue on the door, of a catch and support on the door frame, the support comprising a resilient spring.

7. For use in a combined locking and supporting means for doors, means adapted to be rigidly secured to a door frame, said means having mutually facing catch and support members, the catch being adjustable.

8. For use in a combined locking and supporting means for doors, means adapted to be rigidly secured to a door frame, said means having mutually facing catch and support members, the catch comprising a separately formed toothed member provided with slots, and bolts passing through said slots being provided to detachably and adjustably secure the catch in position.

9. The combination with door and door frame members of a combined door lock and support comprising a catch and support mounted on one member in fixed spaced relationship with an open space therebetween, and a latch bolt, tongue and resilient means mounted on the other member, the tongue being rigid with said member and the latch bolt movable bodily toward and away from the tongue, the resilient means normally resisting movement of the latch bolt toward the tongue, the latch bolt and tongue entering the space between the catch and support when the door is moved toward closed position, the tongue engaging the support and the resilient means maintaining the latch bolt in locking engagement with the latch when the door is in closed position.

10. The combination set forth in claim 9 in which the support comprises a resilient spring.

11. The combination set forth in claim 9 in which the latch bolt is mounted on a slide and the resilient means acts on the slide, movement of the slide under the action of the spring being limited by a positive stop.

12. A combined lock and retainer for doors comprising a latch bolt and a tongue adapted to be mounted on a door and means adapt-



ed to be mounted on a door frame to co-  
operate with said latch bolt and tongue in  
holding the door closed and in fixed posi-  
tion relatively to the frame, the latch bolt  
5 and tongue being relatively movable toward  
and away from each other and the door be-  
ing provided with resilient means normally  
urging relative movement of said members  
in one direction, and means to limit such  
10 movement, the means on the door frame hav-  
ing a catch to deflect and thereafter lock-  
ingly engage the latch bolt and a member to  
engage the tongue to support the same.

13. A combined locking and supporting  
15 means for doors including a plate adapted to  
be secured to a door, a tongue rigidly se-  
cured to said plate and projecting there-  
from, a slide, means for attaching the slide  
to the plate in such manner that it may  
20 have a limited movement relatively thereto  
in a direction transverse to the direction of  
projection of the tongue, a spring for nor-  
mally urging the plate in one direction,  
and a latch bolt rigidly secured to the slide.

25 In testimony whereof I hereunto affix my  
signature.

ALFRED HABERSTUMP.