May 16, 1939. R. E. SHEEHE 2,158,257

CHECK FOR DOORS AND THE LIKE

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Fig. 1.

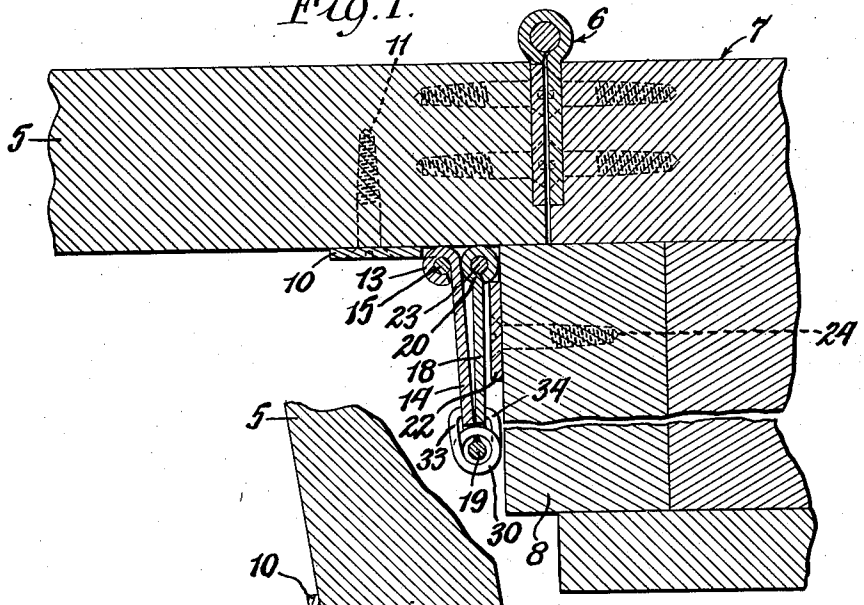


Fig. 3

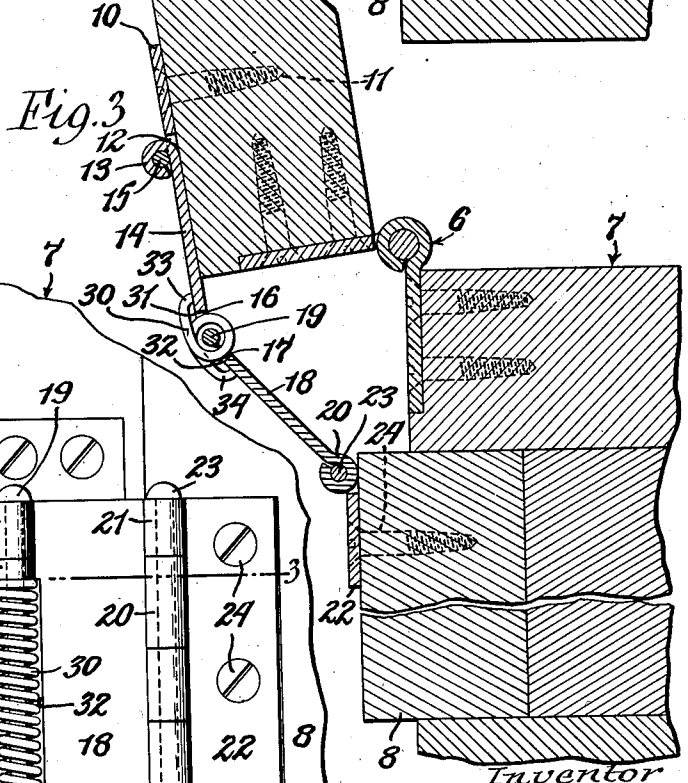
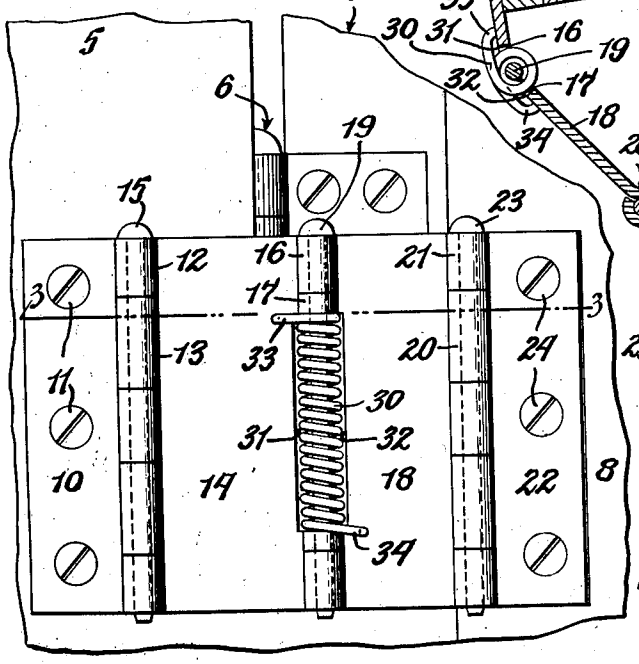


Fig. 2.



Inventor
Robert E. Sheehe
by Popp and Popp
Attorneys

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CHECK FOR DOORS AND THE LIKE

Robert E. Sheehe, Buffalo, N. Y.

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6 Claims. (Cl. 16—82)

This invention relates to a check for doors and the like and more particularly to a combined door check and closer such as are used to prevent the door from being swung open beyond a predetermined point and operate to close the door after the door is released.

One of the objects of the invention is to provide an automatic and positive stop for the door at any angle desired, combining a three or more pivot hinge between the door and the door frame which cooperates with a spring to deliver the maximum closing urge when the door is at the extreme end of an outward swing and gradually reducing this urge until the door is finally and quietly brought to its closed position.

Another object of the invention is to provide such a door closer in which the spring is self-contained and does not require to be separately attached to the door frame or door.

Another object of the invention is to provide such a door check which is a unitary structure and is applied to the inside of the door and door frame adjacent its normal hinges. This renders the door check inconspicuous and also prevents weather conditions from impairing the efficiency of the closer.

Another object of the invention is to provide such a device which, when the door is open, draws into a straight line of hinge leaves so as not to obstruct the free passage of persons or large objects through the doorway and which, when the door is closed, folds flat against the door frame so as to be inconspicuous.

Another aim of the invention is to provide a door check and closer which can be released from both the door and the frame by the simple expedient of withdrawing two pintles so that it is unnecessary to remove screws when it is required to remove or replace the door such, for example, as when the door is a screen door and is removed during the winter months.

Another object of the invention is to provide such a door check and closer which supplements the usual door hinges in supporting the door and prevents sagging, the door checks and closers forming the subject of the invention being preferably applied to both the upper and lower portions of the door so that there is no undue strain or twisting as with a single door check device.

Another aim of the invention is to provide such a door check and closer which can be produced at very low cost; can be readily applied by any householder without requiring the exercise of special skill and which will remain in good service condition for a long period of time under conditions of severe and constant use.

Another object of the invention is to provide such a device which can be used for a variety of analogous purposes, such as for example, as with swinging basement windows or with sliding sash, to permit the windows or sash to be opened a predetermined extent but which cannot be tampered with from the outside to open the window further.

In the accompanying drawing:

Fig. 1 is a horizontal section through a door frame, one of its usual hinges, and a door check and closer embodying my invention and showing the door closed.

Fig. 2 is a fragmentary side elevation of my door check installed upon a door and showing the door opened.

Fig. 3 is a section similar to Fig. 1 and showing the door opened, this section being taken on line 3—3, Fig. 2.

The invention is illustrated in connection with conventional door 5 supported by the usual hinges 6 in a door frame 7, this door frame being provided with the usual stop 8 for limiting the closing movement of the door.

The door check shown consists of four hinge leaves connected by pintles. One of these leaves, designated at 10 is secured to the inner face of the door adjacent its hinge end by a plurality of screws 11 and is formed to provide a plurality of eyes 12 which interfit with the eyes 13 of a second hinge leaf 14. The eyes 12 and 13 are preferably interconnected by a removable pintle 15. At the opposite side of the hinge leaf 14, this hinge leaf is formed to provide eyes 16 which interfit with eyes 17 of a hinge leaf 18. The eyes 16 and 17 are likewise interconnected by a pintle 19.

The opposite side of the hinge leaf 18 is formed to provide a plurality of eyes 20 which interfit with the eyes 21 of a hinge plate 22, the eyes 20 and 21 being preferably connected by a removable pintle 23. The hinge leaf 22 is secured to the inner face of the door stop 8 by a plurality of screws 24.

With a door check as above described it will be noted that when the door is moved from its closed position, shown in Fig. 1, to its open position, shown in Fig. 3, the hinge leaves 10, 14 18 and 22 draw out into a more or less straight line and positively limit the opening movement of the door. At the same time when the door is open, substantially the entire full free area of the door opening is available for moving large objects through the door, the door check therefore not

interfering with the passage of such objects through the doorway. When the door is closed the hinge leaves 10, 14, 18 and 22 assume the position shown in Fig. 1 in which the free hinge leaves 14 and 18 lie flat against the door frame and hence are inconspicuous. The hinge leaves are also preferably made of substantial length so as to aid in preventing sagging of the door.

In order to provide a door check which also operates as a door closer spring means are provided which act to fold the hinge leaves 14 and 18. While a spring could be employed to connect the pintle 19 with the door frame for this purpose, I prefer to employ the self-contained spring 30 shown. This spring is in the form of a helical spring mounted within recesses 31 and 32 provided in the hinge plates 14 and 18 and surrounding the pintle 19. One of the free ends 33 of this spring bears against the outer face of the hinge leaf 14 and its opposite end 34 bears against the outer face of the hinge leaf 18. It will therefore be seen that the spring 30 tends to collapse the hinge leaves 14 and 18 and hence draw the device into the position shown in Fig. 1 in which the door is closed. It will be noted that as the door is opened the spring 30 is placed under increased tension and at the same time the hinge leaves 14 and 18 are drawn into a more or less straight line. Because of this straight line relationship of the hinge leaves 14 and 18 the spring exerts a powerful closing influence as the door approaches its maximum open position, this influence becoming much less powerful as the door approaches its closed position. With the door closer embodying the invention the spring therefore provides a maximum closing urge when the door is at the extreme end of its outward swing and gradually reduces this urge until the door is finally and quietly brought to its closed position.

From the foregoing it will be seen that the present invention provides a door check and closer which is extremely simple and reliable in operation and at the same time can be produced at very low cost. Further it does not interfere with the free area provided when the door is open; is folded flat against the door frame and inconspicuous when the door is closed; is mounted on the inside of the door so as not to be subjected to weathering; can be easily installed and readily removed by the simple expedient of removing the pintles 15 and 23 and the spring 30 acts with decreasing force as it draws the door to a closed position thereby to prevent an undesirable slamming of the door. It will furthermore be seen that the invention can be used for other analogous purposes such as limiting the opening movement of both sliding sash and swinging windows so as to provide ventilation and at the same time prevent the entrance of unauthorized persons through the window.

I claim as my invention:

1. A positive check for two relatively movable members, comprising a flat, rectangular hinge leaf secured to one of said members, a flat, rectangular hinge leaf secured to the other of said members and at least two additional hinge leaves pivotally connected to one another and pivotally connected to said secured hinge leaves, said hinge leaves being pivotally connected in tandem along their corresponding long edges and the pivotal connections between each of said hinge leaves being so arranged that in the closed position of said movable member, said additional hinge leaves are capable of assuming a position substantially flat against one another and substantially flat against one of said secured leaves, the axes of said pivotal connections being parallel with the major axes of said hinge leaves.

2. A positive check for two relatively movable members, comprising a flat, rectangular hinge leaf secured to one of said members, a flat, rectangular hinge leaf secured to the other of said members, at least two additional flat, rectangular hinge leaves pivotally connected to one another and pivotally connected to said secured hinge leaves, said hinge leaves being pivotally connected in tandem along their corresponding long edges and the pivotal connections between each of said hinge leaves being so arranged that in the closed position of said movable member, said additional hinge leaves are capable of assuming a position substantially flat against one another and substantially flat against one of said secured leaves, the axes of said pivotal connections being parallel with the major axes of said hinge leaves and spring means for urging said leaves into said position.

3. A positive check for two relatively movable members, comprising a flat, rectangular hinge leaf secured to one of said members, a flat, rectangular hinge leaf secured to the other of said members, at least two additional flat, rectangular hinge leaves pivotally connected to one another and pivotally connected to said secured hinge leaves, said hinge leaves being pivotally connected in tandem along their corresponding long edges and the pivotal connections between each of said hinge leaves being so arranged that in the closed position of said movable member, said additional hinge leaves are capable of assuming a position substantially flat against one another and substantially flat against one of said secured leaves, the axes of said pivotal connections being parallel with the major axes of said hinge leaves and spring means connected with the pivotal connection between said additional hinge leaves for urging said leaves into said position.

4. A positive check for two relatively movable members, comprising a flat, rectangular hinge leaf of substantial length secured to one of said members, a flat, rectangular hinge leaf of substantial length secured to the other of said members, at least two additional flat, rectangular hinge leaves of substantial length pivotally connected to one another and pivotally connected to said secured hinge leaves, said hinge leaves being pivotally connected in tandem along their corresponding long edges and the pivotal connections between each of said hinge leaves including relatively long pintles and being so arranged that in the closed position of said movable member, said additional hinge leaves are capable of assuming a position substantially flat against one another and substantially flat against one of said secured leaves, the axes of said pivotal connections being parallel with the major axes of said hinge leaves and a spring surrounding the pintle connecting the said additional hinge leaves and having one free end bearing against the outer face of one of said additional hinge leaves and its other free end bearing against the outer face of the other of said additional hinge leaves thereby to urge said leaves into said position.

5. A positive check for a swinging panel hinged at one end to a frame to swing about an axis, comprising a flat, rectangular hinge leaf secured flat against said swinging panel at its hinge supported end and against the major face remote

from said axis, a second flat, rectangular hinge leaf secured flat against said frame on the side of the swinging panel opposite said axis, and at least two additional flat, rectangular hinge leaves pivotally connected along their long edges to one another and pivotally connected along their long edges in tandem to the long edges of said secured hinge leaves, the pivotal connections for said hinge leaves being arranged parallel with the major axes of said leaves and so arranged that in the closed position of said panel, said additional hinge leaves are capable of assuming a position substantially flat against one another and substantially flat against one of said secured leaves.

6. A positive check for a swinging panel hinged at one end to a frame to swing about an axis, comprising a flat, rectangular hinge leaf secured flat against said swinging panel at its hinge supported end and against the major face remote from said axis, a second flat, rectangular hinge leaf secured flat against said frame on the side of the swinging panel opposite said axis, at least two additional flat, rectangular hinge leaves pivotally connected along their long edges to one another and pivotally connected along their long edges in tandem to the long edges of said secured hinge leaves, the pivotal connections for said hinge leaves being arranged parallel with the major axes of said leaves and so arranged that in the closed position of said panel, said additional hinge leaves are capable of assuming a position substantially flat against one another and substantially flat against one of said secured leaves, and spring means for urging said leaves into said position.

ROBERT E. SHEEHE.