My invention relates to closers and/or checks and closers for inner and outer closures. As is well known, most outer closures or doors for houses are provided with an inner door for general use and an outer door in the form of a screen door or a storm door. Frequently the screen door is a combined screen and storm door, whereby the same is in position throughout the year. As is well known, the inner door is usually, or at least frequently, provided with a spring-actuated closer and/or a combined closer and check. On the other hand, the outer door is conventionally provided with a coil spring for loading the same to a closed position. In any event, it is customary to provide separate closers and/or separate combined checks and closers for the inner and outer doors.

With the foregoing in view, it is an object of my invention to provide a single closer and/or a single combined check and closer for inner and outer closures of the class described.

A further object is to provide an improved closer and/or an improved combined check and closer for inner and outer closures of the class described, which comprises a pair of closer arms having similar ends pivotally connected to opposed faces of the closures and opposite ends connected to spring means supported by said arms between the closures for loading both closures to closed positions.

Other objects and advantages reside in the particular structure of the invention, combination and arrangement of the several parts thereof, and will be readily understood by those skilled in the art upon reference to the attached drawings in connection with the following specification, wherein the invention is shown, described and claimed.

In the drawings:

Figure 1 is a bottom plan view of a pair of closures showing the device of the invention applied thereto and with the closures in the closed positions;

Figure 2 is an elevational view on an enlarged scale and showing the closer in the position occupied when the closures are open;

Figure 3 is a plan view of the structure of Figure 2;

Figure 4 is a transverse vertical sectional view taken on a substantially larger scale and taken substantially on the plane of the line 4-4 of Figure 3;

Figure 5 is a horizontal sectional view taken substantially on the plane of the line 5-5 of Figure 4, parts being omitted;

Figure 6 is a horizontal sectional view taken substantially on the plane of the line 6-6 of Figure 4;

Figure 7 is a horizontal sectional view taken substantially on the planes of the lines 7-7 of Figure 4;

Figure 8 is an elevational view taken substantially on the plane of the line 8-8 of Figure 7 and illustrating a detail, parts being omitted;

Figure 9 is a longitudinal vertical sectional view taken substantially on the plane of the line 9-9 of Figure 3;

Figure 10 is an exploded view of one end of a closer arm showing the parts in elevation;

Figure 11 is a view similar to Figure 10, but showing the parts in plan;

Figure 12 is a bottom plan view showing an auxiliary attachment for one of the closer arms;

Figure 13 is a view like Figure 1, but showing means for utilizing the attachment of Figure 12.

Referring specifically to the drawings, wherein like reference characters have been used throughout the several views, to designate like parts, 14 designates any suitable jamb for a pair of inner and outer closures 15 and 16. In the embodiment shown, the closures 15 and 16 comprise inner and outer doors and will be so referred to hereinafter. However, it should be understood that the device according to the invention is adapted to be applied to closures other than doors. Thus, the inner and outer doors 15 and 16 are hingedly connected to the jamb 14 by hinges 17 connected to adjacent edges of the doors. The axes of the hinges 17 are substantially parallel, but in practice, as is well known, it is virtually impossible to achieve absolute parallelism whereby a feature of the invention to be apparent later is useful. The doors 15 and 16 swing in opposite directions to open, as is customary in inner and outer doors.

Each door has secured thereto on the facing surfaces thereof a bracket 18 which is located in forwardly-offset relation to the hinges 17. Each bracket 18 includes a pair of vertically-spaced, inwardly-directed ears 20 which are spanned by any suitable or well-known pivot 21. Each pivot pivotally mounts a link 22, whereby the links are swingable about axes substantially parallel to the axes of the hinges 17. As best seen in Figures 10 and 11, each pair of ears 20 includes a floor 23 which at times abuts the square corner 24 of the inner end of the link 22. The effect of such abutment is to prevent rotation of the link 22 about the pivot 21 beyond a certain point in one direction. The remainder of the outer end
of the link 22 is formed to provide an arcuate surface 25 to permit free pivoting of the link in one direction relative to the pivot 24. In this connection, it should be noted that although both links 22 are substantially identical, the square corners 24 and arcuate surfaces 25 of each link 22 are reversed, as best seen in Figure 3, whereby each link is freely pivotable in opposite directions for a purpose described later. That is to say, the link for the door 15 may pivot from a position at right angles to the closure 15 in a clockwise direction to a position substantially parallel to the door 15. Likewise, the link 22 for the door 16 may pivot from a position at right angles to such door 16 in a counterclockwise direction to a position substantially parallel to such door. However, pivoting of both links in a clockwise and counter-clockwise direction respectively is limited by the engagement of the square corners 24 with the floors 23 of the brackets to positions wherein the links project from the doors at right angles thereto or substantially at right angles thereto.

The outer end of each link 22 is formed with a pair of vertically disposed and horizontally spaced ears 26 which are spanned by any suitable pivot 27 upon which is pivotally mounted the inner end of a second link 28. Each link 28 includes an outer end providing a square corner 29 and an arcuate surface 30 which are similar to the square corners 24 and arcuate surfaces 25 of the first-mentioned links 22. However, as illustrated in Figure 11, particularly, the square corners 29 are oppositely disposed relative to the square corners 24, as are the arcuate surfaces 30 relative to the surfaces 25. The square corners 29 of the links 28 are adapted at times to abut the floors 21 of the slots provided between the spaced ears 32 of sleeves 33. Pins 34 provide pivots spanning the ears 32 and pivotally connecting the links 28 to the sleeves 33. The axes of the pivots 34 are substantially parallel to the pivots 21. As clearly seen in Figure 3, the square corners 29 limit pivotal movement of the links 28 relative to the sleeves 33 to positions wherein the links 28 are aligned with the sleeves 33, but permit free pivotal movement to positions wherein the links 28 extend at right angles to the sleeves 33. However, it should be noted that the pivotal movement of the link 28 on the door 15 is limited to a counterclockwise direction to the position at right angles to the sleeve 33, while the pivoting of the link 28 on the door 16 is limited to a clockwise direction relative to its sleeve 33.

The purpose of the links 22, 28, together with their pivots 21, 27 and 34, is to provide means to permit slight sagging of the doors 15 and 16 as they are swung to and from the open and closed positions.

The outer end of each sleeve 33 is axially apertured for the sliding reception therein of a closer arm 36 or 38. The closer arms are secured in longitudinally-adjusted relation relative to the sleeves 33 in any suitable manner, as by the set screws 37. The outer ends of the closer arms 36 and 38 are pivotally connected to a spring closer for the doors 15 and 16, or, as in the form illustrated, to a combined check and closer now to be described.

The combined check and closer comprises a substantially cylindrical housing 40 comprising interiorly an upper or spring compartment 41 and a lower or fluid compartment 42. The housing 40 is provided with a substantially radially-directed lug 43 which comprises an integral ex-
the device will normally have proceeded with the opening of the other closure 15 where a reverse pivoting of the parts will be achieved, and, upon release of the closure 15, both closures will return to the Figure 1 position. It is likewise possible to open both closures simultaneously, as clearly shown in Figure 3, and in this connection it should be noted that when the closures 15 and 16 are fully opened, the arms 28 and 30 have moved past a dead center whereby the spring 60 tends to load the arms and the closures to the open position shown, thus providing means for retaining the doors in the open positions.

As far described, the operation has not been limited to the closer feature, but it should be noted that the lower compartment 42 for the housing 40 comprises a check or buffer compartment now to be described. Thus, the shaft 44 has fixed thereon a radially-directed piston 70 and the side wall of the chamber 42 is provided with a radially inwardly-directed abutment or wall 74 providing a pair of ports 72 and 73 therethrough. Passage of fluid through the outermost port 72 may be regulated by any suitable means, such as the set screw 74, whereby the passage is enlarged or reduced. The inner passage 73 is provided with a spring-loaded ball check valve 75 of well known form. The check valve 75 is held in position by any suitable attaching plate 76, which may be suitably perforated as shown in Figure 8, and any suitable spring 77 loads the ball 75 against its seat, whereby passage of the liquid through the inner passage 73 is uni-directional. It is apparent from the foregoing that as the closer arms 28 and 30 move in opposite directions relative movement is imparted to the wall 71 and piston 70 in a well known manner. As viewed in Figure 7, when the rotation of the piston 70 is in a clock-wise direction, the pressure created by the piston will unseat the ball 75 and permit free passage of fluid through not only the outer passage 72, but also the inner passage 73. However, when the movement of the piston 70 is in a counter-clock-wise direction, as when the door is closing, the pressure created will force the valve 75 to seat, whereby passage of the liquid through the wall 71 is limited to the outermost passage 72. Thus, movement of the door in a closing direction is checked and is relatively slow. However, when the door approaches the closed position, a quick closing is desired to catch the latch feet, of the doors to engage. Thus, the wall for the chamber 42 is cut away, as at 78, adjacent the wall 71, whereby to permit free passage of the fluid around the end of the piston 70 and permit a quick closing of the door in the last stages thereof. It follows from the foregoing that the spring 60 will load the doors 15 and 16 to the closed positions, but movement to the closed positions is restricted by the check apparatus in the chamber 42.

In Figures 12 and 13, there is illustrated a structure which is adapted to be utilized when, for any reason, it is not desired to complete the closure 15 to the device. This structure comprises an auxiliary sleeve 80 which is secured to the arm 66 in place of the sleeve 33. The outer end of the sleeve 80 is bifurcated, as at 81, and provides at the free ends of the furcations a ball socket 82 for resiliently engaging a ball pivot 83 carried by any suitable bracket 84 mounted on the upper sill of the door opening. Thus, with the sleeve 80 attached to the ball pivot 83, as shown in Figures 13 and 12, the device functions as a usual closer and/or combined check and closer for a single door, such as the door 16.

While I have shown and described what is now thought to be a preferred embodiment of the invention, it is to be understood that the same is susceptible of other forms and expressions. Consequently, I do not limit myself to the precise structures shown and described hereinabove except as hereinafter claimed.

I claim:

1. A closure closer for an inner and an outer closure wherein said closures are spaced and hingedly mounted on adjacent hinges having substantially parallel axes, comprising a pair of closer arms, pivot means pivotally connecting the ends of each arm to opposite closures in offset and substantially parallel relation to said axes of said hinges whereby to dispose said arms between said closures substantially at right angles to said axes of said hinges, a helical spring between said closures, said spring including inner and outer ends and an axis substantially parallel to said axes of said hinges, and means operatively connecting opposite ends of said arms respectively to said inner and outer ends of said spring whereby to support the same between said closures in offset relation to said hinges and pivot means and load both closures toward closed positions.

2. A closure closer for an inner and an outer closure wherein said closures are spaced and hingedly mounted on adjacent hinges having substantially parallel axes, comprising a pair of closer arms, a bracket on each closure, a link means extending between each closure arm and the bracket adjacent thereto and having one end secured to one arm, pivot means pivotally connecting the other end of said link means to said adjacent bracket, whereby to dispose said arms between said closures substantially at right angles to said axes of said hinges, a helical spring between said closures, said spring including inner and outer ends and an axis substantially parallel to said axes of said hinges, and means operatively connecting said arms respectively to said inner and outer ends of said spring whereby to support the same between said closures in offset relation to said hinges and pivot means and load both closures toward closed positions.

3. A closure closer for an inner and an outer closure wherein said closures are spaced and hingedly mounted on adjacent hinges having substantially parallel axes, comprising a pair of closer arms, a bracket on each closure, a sleeve on an end of each of said closure arms and carried by the latter, a link means extending between a closure arm and the bracket adjacent thereto and having one end secured to the sleeve of the closure arm adjacent thereto, pivot means pivotally connecting the other end of said link means to said adjacent bracket, whereby to dispose said arms between said closures substantially at right angles to said axes of said hinges, and means operatively connecting said arms respectively to said inner and outer ends of said spring whereby to support the same between said closures in offset relation to said hinges and pivot means and load both closures toward closed positions.

4. The combination with an inner closure and a spaced outer closure, wherein adjacent edges of both closures are hingedly connected to a closure
frame by hinges for swinging movement in opposite directions to open said closures, of a single closer for both closures, comprising a separate closure arm pivoted to each closure in offset relation to said hinges, and a single spring resiliently connecting said arms together between said closures.

5. The combination with an inner closure and a spaced outer closure, wherein adjacent edges of both closures are hingedly connected to a closure frame by hinges for swinging movement in opposite directions to open said closures, of a single check and closer for both closures, comprising a separate closer arm pivoted to each closure in offset relation to said hinges, and a single combined check and closer pivotally and resiliently connecting said arms together between said closures.

ALBERT E. HILL.

REFERENCES CITED

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

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>418,462</td>
<td>Heiney</td>
<td>Dec. 31, 1889</td>
</tr>
<tr>
<td>2,332,753</td>
<td>Rawlings</td>
<td>Oct. 26, 1943</td>
</tr>
</tbody>
</table>

FOREIGN PATENTS

<table>
<thead>
<tr>
<th>Number</th>
<th>Country</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>200,041</td>
<td>Germany</td>
<td>July 6, 1908</td>
</tr>
</tbody>
</table>