Dec. 15, 1931. F. N. CARLSON 1,836,013

DOORCHECK

Filed May 11, 1929 3 Sheets-Sheet 1

Fig. 1

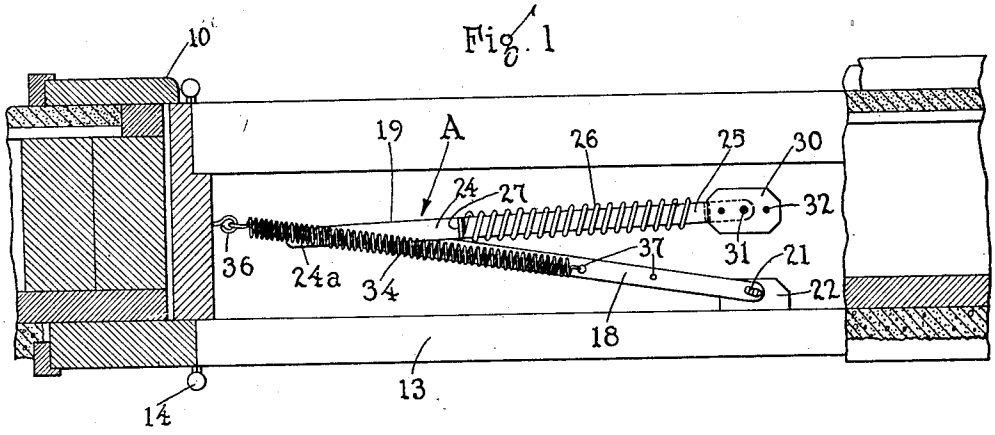
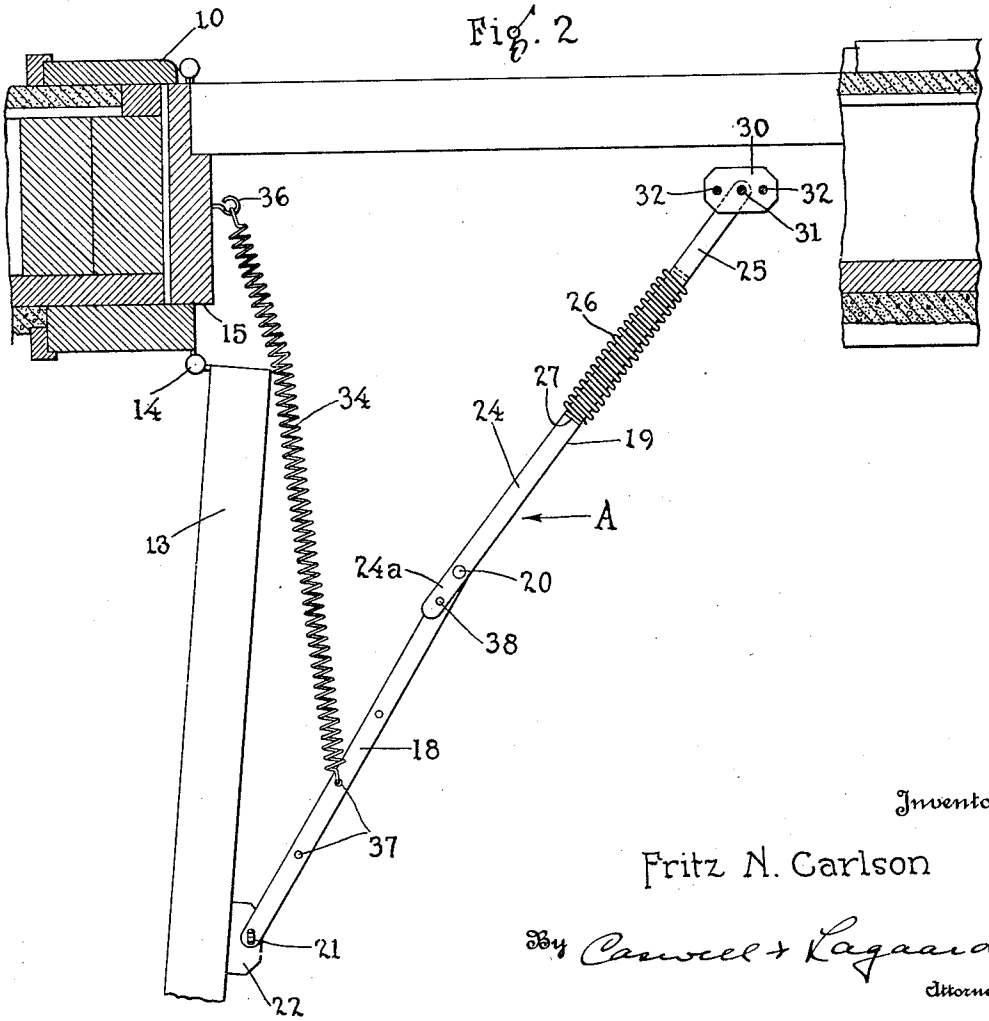


Fig. 2



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DOORCHECK

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Fig. 4

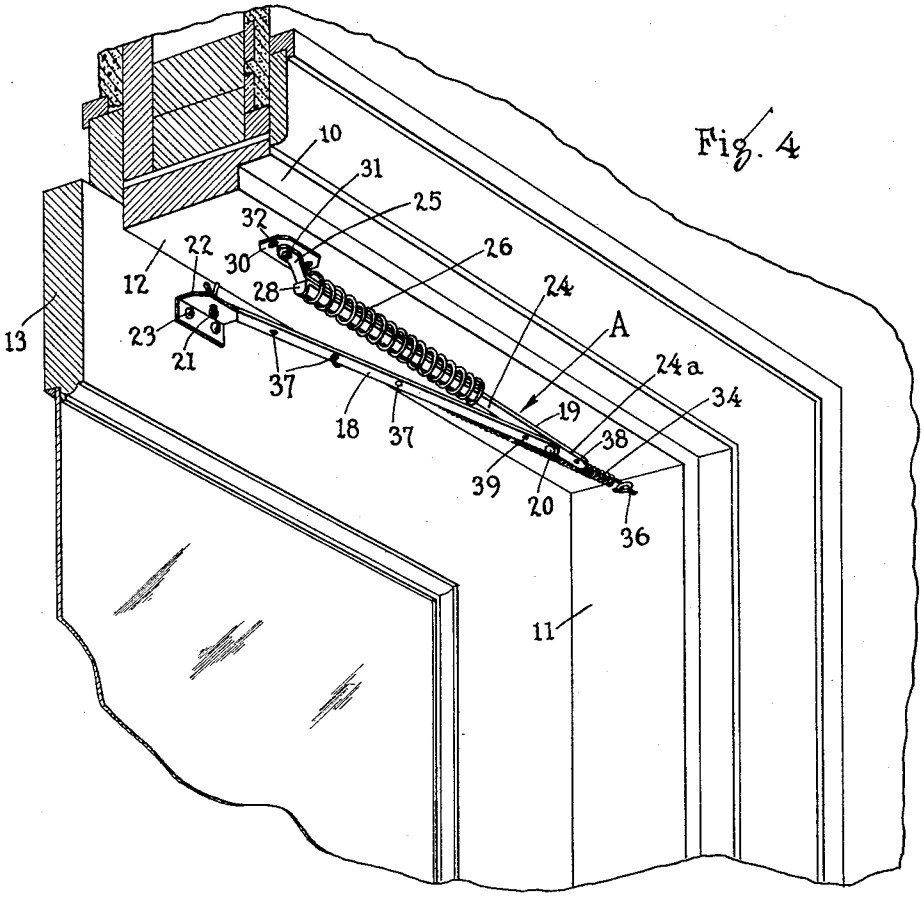
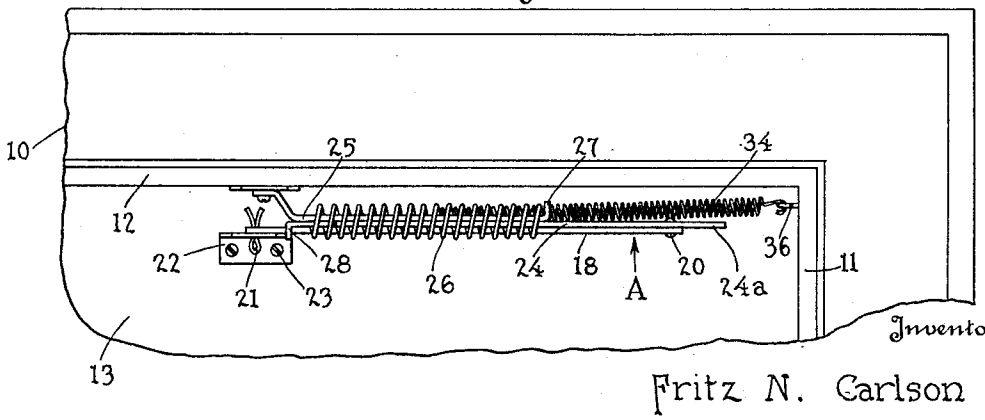


Fig. 3



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DOORCHECK

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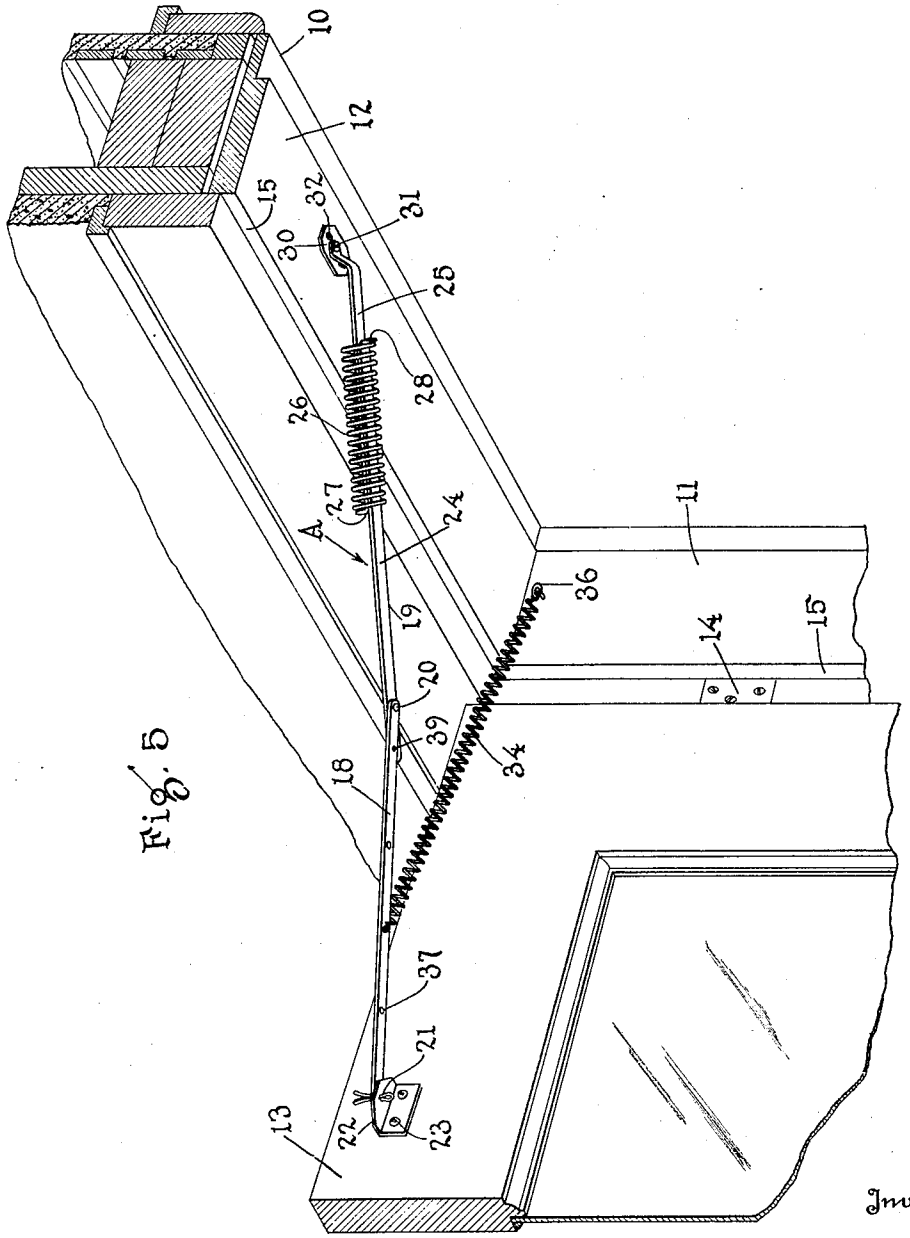

Fig. 5

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UNITED STATES PATENT OFFICE

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DOORCHECK

Application filed May 11, 1929. Serial No. 362,330.

My invention relates to improvements in door checks particularly, though not exclusively, for the outer storm and screen doors of dwellings.

These doors are customarily self-closing ordinarily as by means of extensible springs stretched between the doors and door frames. Such doors, however, are occasionally swung open with such violence, as by the wind or by children or others, that the doors are sometimes torn from their hinges or whipped against the buildings with consequent injury thereto and with annoying jarring and banging impacts.

An object of my invention is to provide a simple, durable and inexpensive door check that may be easily and quickly installed with ordinary household tools by unskilled persons and which will operate effectively to check the opening swinging movement of a door to which it is applied.

Another object of the invention resides in adapting in the combination, the usual tension spring customarily stretched between door frame and door for closing the latter and in so arranging the parts that the opening movement of the door is checked at that stage wherein said tension spring is rendered practically ineffective by being bent over the edge of the door.

A further object of the invention resides in providing a jointed arm for limiting the movement of the door and in connecting said tension spring to one of the members of said arm so that it will operate, not only to close the door, but also to break and fold said arm as the door is closed.

Another object of the invention resides in constructing one of the members of said arm so as to render it extensible and in providing resilient means cooperating with the extensible member for the purpose of resiliently checking the opening swinging movement of the door at a predetermined stage therein.

A feature of the invention resides in constructing said extensible member with overlapping portions slidable relative to one another, and in providing a compression coil spring encircling and holding together said overlapping portions.

A further object of the invention resides in forming the ends of said overlapping portions with outwardly extending ears against which the ends of said coil spring are adapted to seat.

With the foregoing and other objects in view, which will appear in the following description, the invention resides in the novel combination and arrangement of parts and in the details of construction hereinafter described and claimed.

In the drawings:

Fig. 1 is a plan view of a door check embodying my invention, the same being illustrated as applied to a door and door frame, the latter being partially broken away to disclose the check.

Fig. 2 is a view similar to Fig. 1, except that the door is shown in its open position, whereas in Fig. 1, the door is closed.

Fig. 3 is an elevational view of the form of door check shown in Figs. 1 and 2.

Fig. 4 is a fragmentary perspective view illustrating an outer door and door frame and a form of my invention applied thereto, the door being shown closed.

Fig. 5 is a view similar to Fig. 4, the door being shown in open position.

For the purpose of illustrating the application of the invention, I have shown in the drawings, a part of an ordinary door frame 10 including stiles 11 and a header 12. In conjunction with this door frame, I have shown an ordinary outer door 13 hingedly connected to one of the stiles 11 by a hinge 14 upon which said door 13 may swing to and fro between its closed position, shown in Figs. 1, 3 and 4, and open positions, shown in Figs. 2 and 5. When the door 13 is closed, it abuts against the usual stops 15 formed by edges of the stiles 11 and header 12. As will readily become apparent, the invention may be applied to any type of door or frame, the form shown being selected merely for the purpose of illustration.

The invention proper comprises a jointed arm A, which consists of two links or members 18 and 19. These two links are preferably constructed of bar material and are pivotally connected, one to the other, by means

of a rivet 20. The member 18 is pivoted by means of a cotter-pin 21 or other suitable pintle to a bracket 22 secured by screws 23 to the upper portion of door 13, at a suitable distance from the hinged edge thereof, while the member 19 is connected to the door frame header 12 in a manner presently to be described. When the door 13 is closed these members 18 and 19 jack knife together in position along the upper portion of the door, as shown in Figs. 1, 3 and 4.

The member 19 of arm A consists of two portions 24 and 25 which overlap one another, as best shown in Figs. 3, 4 and 5. A compression coil spring 26 encircles the overlapping parts of said portions of member 19 and serves to slidably support the said portions relative to one another. The extremity of the portion 25 is bent up to provide an upstanding ear 27, while the extremity of the portion 24 is bent down to provide a depending ear 28. These ears engage opposite ends of the spring 26, said spring being adapted to be brought into action upon the sliding of the link portions 24 and 25 relative to one another, occasioned by the extension of the member 19. The end of portion 25 of member 19, opposite said ear 27, is pivotally connected to the door frame header 12 by means of a screw 31. This screw is reinforced by passing the same through a plate 30, which is secured by screws 32 to said header 12.

In conjunction with the jointed arm A, I employ an ordinary tension coil spring 34 which, in the usual manner, is hooked into a screw eye 36 or similar attaching device screwed into the stile 11 of the door frame 10. The other end of said spring 34, instead of being fastened to the door proper, is hooked into one or another of several apertures 37 in member 18 of arm A. These apertures, formed in succession along said member, are provided to accommodate springs of different lengths and to allow for the tensioning of the particular spring employed in the event that it may become weakened in use.

When the door is closed, the arm A is broken and lies folded, as shown in Figs. 1, 3 and 4. In this position, the coil spring 34 is most nearly retracted, but is, however, sufficiently tensioned to retain the door closed. The portions 24 and 25 of member 19 are relatively free, the spring 26 being fully expanded. Upon the swinging of the door 13 outwardly, the spring 34, which at all times acts to close the door, is additionally tensioned. As the door opens, the members 18 and 19 of arm A are swung about the pivot 20 and approach alignment. Throughout the major portion of said movement, the spring 34 alone is brought into action, the same being tensioned to return the door into closed position and at the same time exerting a force upon the arm A, serving to retain the members 18 and 19 thereof in broken relation. As the door nears its final open position, after having swung substantially ninety degrees, the member 19 of arm A is extended by the sliding of the portion 24 thereof relative to the portion 25. This brings the ears 27 and 28 toward one another against the action of the spring 26, which is compressed between said ears. The compression of this spring serves to retard the final opening of the door and ultimately completely checks its opening movement, thus preventing injury to the door, hinges and frame which otherwise might be caused through the violent opening of the door, as by the wind or otherwise. Throughout the final opening movement of the door, the spring 34 also exerts a force tending to prevent the opening of the same and at the same time applies its force through the member 18 of arm A in such a manner as to prevent the members 18 and 19 of said arm from ever becoming aligned and thus locked on or moved past dead center. Due to this action, the arm A is at all times broken and is readily folded by the spring 34 into position shown in Figs. 1, 3 and 4, as the door is closed by said spring. Attention is invited to Fig. 2 and the relative positions of the parts as therein disclosed. Here, it will be noted that the spring 34 in being bent over the inner edge of the door 13 is so positioned as to exert a minimum force against the further opening of the door. But, it will also be noted that the resistance against such opening of the door at this point is otherwise progressively increasing, due to the coming into action of the spring 26 of member 19 of the arm A. Thus, when the effectiveness of spring 34 in resisting the opening movement of the door is minimized, the yieldingly extensible arm 19 comes into play to resist such movement of said door.

Having reference particularly to Figs. 3 and 4, it may be seen that the member 18 of arm A is connected by the pivot 20, not to the extremity of portion 24 of member 19, but substantially short of the extremity thereof. In this construction an end-piece 24^a projects beyond the pivot 20, an aperture 38 being formed therein. This aperture 38 registers with an aperture 39 in the member 18, when the parts take the relative positions shown in Figs. 2, 4 and 5 and through these registering apertures, the user may insert a pin, nail or other suitable stop to keep the arm A from folding together under the action of the spring 34 and thus secure the door in open position.

Referring to Figs. 1, 3 and 4, it may be seen that the spring 34 supports the free end of the folded arm A, thus preventing any objectionable sagging of the structure. This provision permits of the employment of loose connections between the member 18 and door 13 and between the member 19 and header

12 and thus avoids the necessity of expensive and carefully fitted pivoting devices, such stock expedients as the screw 31 and cotter-pin 21 being satisfactory for the purpose.

With my invention, the force of the door, upon being violently opened, is entirely absorbed, thus preventing injury to the door, door frame and hinges. The device is exceedingly simple in construction, comprising but the jointed arm and the two springs which function in a manner to cause the device to operate positively in all positions of the door. The members of the jointed arm, due to the tension spring 34, may never come into alignment to interfere with the subsequent folding of the arm, regardless of the degree of opening of the door. Upon removal of the force tending to open the door, the force of the spring 34 upon the member 18 of arm A, causes said arm to break and move into folded position. The device may be constructed of bar material, rods or other suitable material at an exceedingly nominal cost, and is positive in action. The device may be confined within the space ordinarily present between inner doors and outer doors, thereby making the invention particularly adaptable for application to existing building construction.

Changes in the specific form of my invention, as herein disclosed, may be made within the scope of what is claimed without departing from the spirit of my invention.

Having described my invention, what I claim as new and desire to protect by Letters Patent is:

1. A door check for attachment to a swinging door and frame comprising a jointed arm connected to said door and to said frame for limiting the opening of the door, and a tension coil spring connected to the arm adjacent said door and to said frame, said coil spring exerting a force upon said arm tending to break the joint thereof and move the door toward its closed position.

2. A door check for attachment to a frame and to a door hinged thereto, said check comprising a jointed arm including two members pivoted together, one member being pivotally connected with the door and the other member pivotally connected with the frame, one of said members being yieldingly extensible, and a tension coil spring attached at one end to the frame and at the other end thereof to one of said members, said spring acting upon the arm to fold the same and through the arm to close the door.

3. A door check for attachment to a frame and to a door hinged thereto, said check comprising an arm including two members, one pivotally connected at one end to the door and the other pivotally connectd at one end to the frame, the other end of one member being pivotally connected to the other member at a point inside of the extremity thereof, said extremity being formed with an aperture therein and the other member being formed with a similar aperture, the two being adapted to register in an extended position of the arm at a predetermined stage in the opening of the door, said apertures, when in registration, being adapted to receive a stop pin to lock the arm against folding and to hold the door open.

4. A door check for attachment to a frame and a door hinged thereto, said check including a folding arm comprising two members attached to said door and to said frame and adapted to approach alignment upon the opening of the door, the length of said arm with the members in alignment being less than the distance between the points of attachment of the members of said arm to said door and frame when the door is in open position, a spring connected to said arm intermediate the ends thereof and to said door frame for moving said door into closing position, said spring operating to fold said arm.

5. A door check for attachment to a swinging door and frame, said check including a jointed arm connected to said door and frame, resilient means for moving said door into closing position, said arm having parts adapted to overly one another at certain positions of the door, and means simultaneously engaging both of said parts for holding said parts immovable to prevent the swinging of the arm in either direction.

6. A door check for attachment to a frame and to a door hinged thereto, said check comprising a jointed arm connected to said door and to said frame, the member thereof connected with the frame being yieldably extensible and resilient means connected to the other member intermediate its ends and to the frame for urging the door closed.

7. A door check for attachment to a frame and to a door hinged thereto, said door check comprising a jointed arm, one of the members thereof being pivoted to the door at a point remote from the axis of the hinge thereof, the other member thereof being pivoted to the door frame at a point remote from the axis of the door hinge and at a locality in proximity to the pivot of the other member to the door when the door is in closed position, so as to cause the arms to swing substantially into the plane of the door when in closed position and a tension coil spring connected at one end to said frame in proximity to the axis of the door hinge and at its other end to the member pivoted to said door for urging said door closed and for breaking the joint of said arm.

8. A door check for attachment to a frame and to a door hinged thereto, said door check comprising a jointed arm, one of the members thereof being pivoted to the door at a point remote from the axis of the hinge thereof, the

other member thereof being pivoted to the the door frame at a point remote from the axis of the door hinge and at a locality in proximity to the pivot of the other member to the door, when the door is in closed position, so as to cause the arms to swing substantially into the plane of the door when in closed position and a tension coil spring connected at one end to said frame in proximity to the axis of the door hinge and at its other end to the member pivoted to said door for urging said door closed and for breaking the joint of said arm, said spring being connected to the last named member intermediate its ends.

9. A door check for attachment to a swinging door frame comprising a jointed arm, pivoted at one end to the door and at the other end to the frame at points remote from the axis of the door hinge, said arm being adapted upon the closing of the door to fold horizontally in the direction of the axis of the door hinge and a tension coil spring secured at one end to one of said arms outwardly from its pivot and at its other end to said door frame near the axis of the door hinge and at an elevation above that of said jointed arm, said spring operating to fold said arm to close the door and to support the arm against sagging when in its folded position.

In testimony whereof I have affixed my signature to this specification.

FRITZ N. CARLSON.