

Aug. 11, 1931.

B. SUMMERFIELD

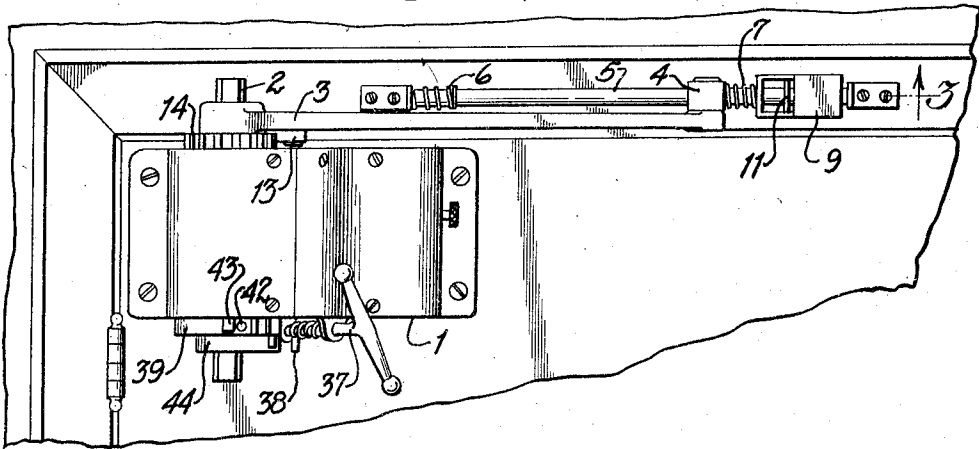
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DOORCHECK

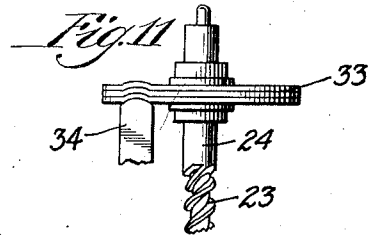
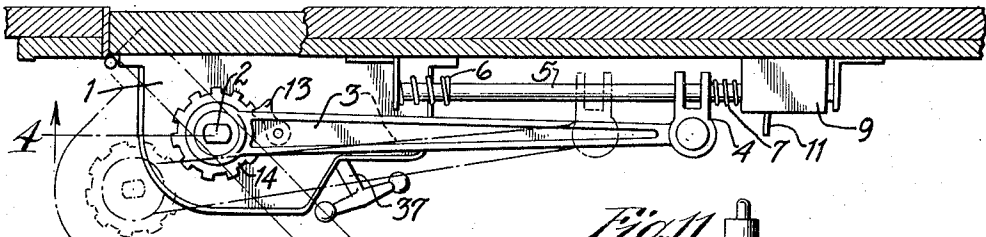
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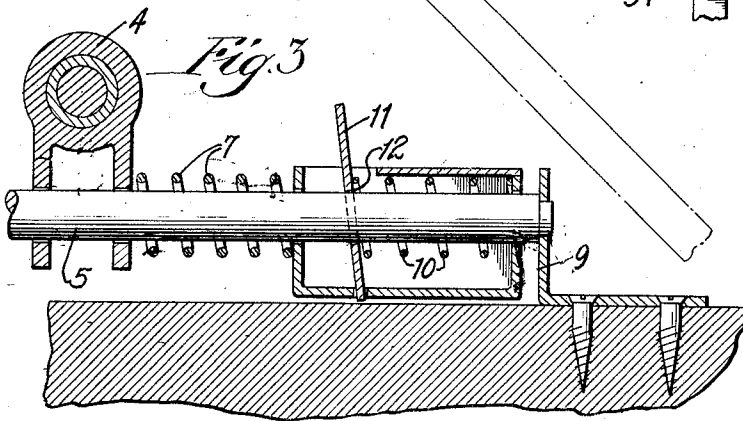
*Fig. 1*



*Fig. 2*



*Fig. 3*



*Inventor:*  
*Bernard Summerfield*  
*By J. Campbell & Co., Chgo. Ill.*  
*Attys.*

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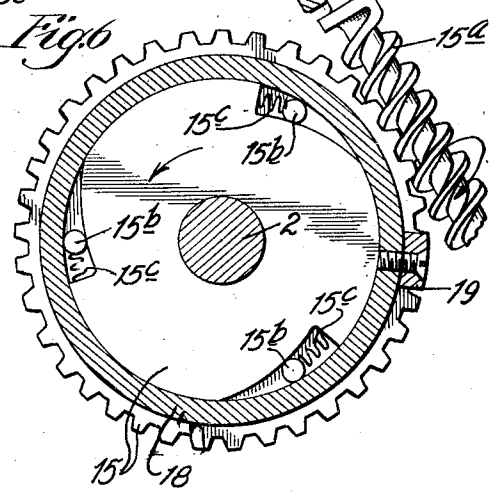
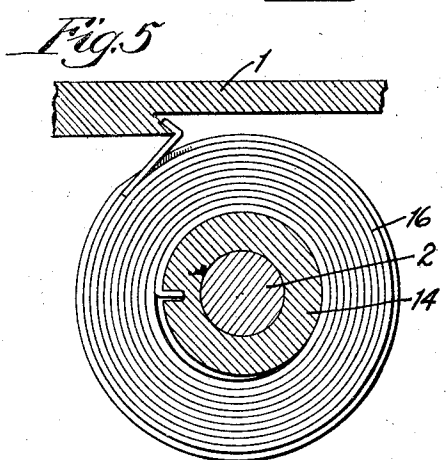
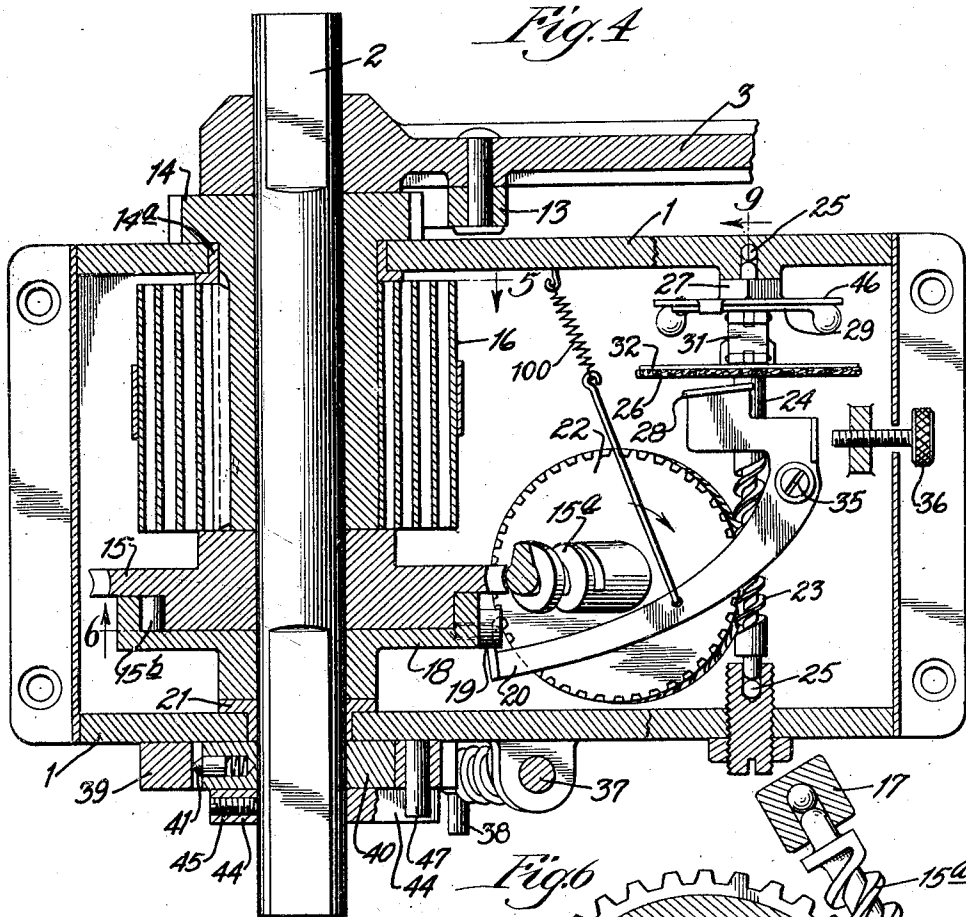
B. SUMMERFIELD

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DOORCHECK

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3 Sheets-Sheet 2



*Inventor:*  
Bernard Summerfield,  
By *Sympson, Le, Chittenden & Wiles,*  
*Attys*

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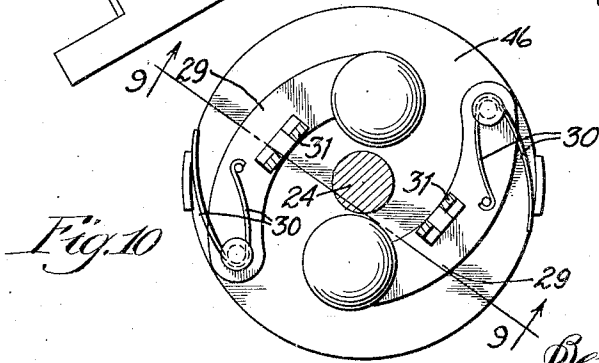
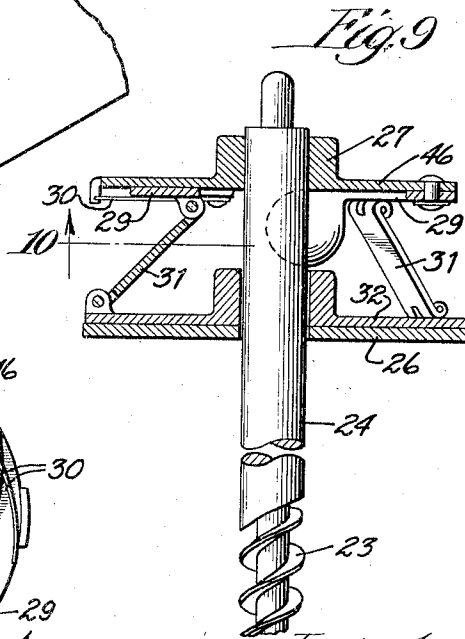
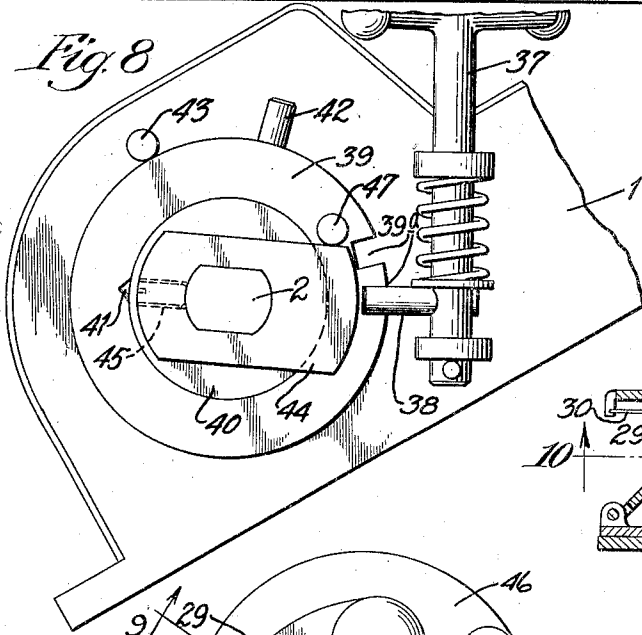
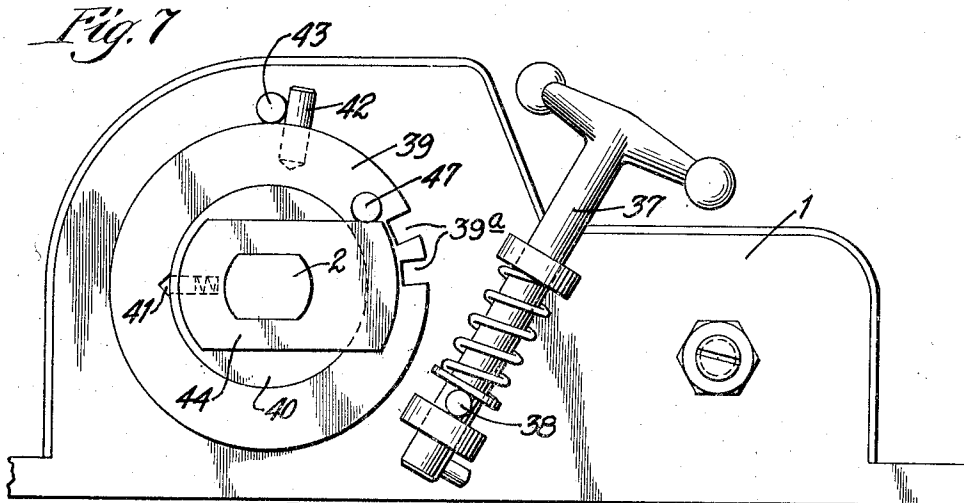
B. SUMMERFIELD

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DOORCHECK

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3 Sheets-Sheet 3



*Inventor:*  
*Bernard Summerfield,*  
*By Seymour Smith, Leo Chatter & Miles,*  
*Attys.*

# UNITED STATES PATENT OFFICE

BERNARD SUMMERFIELD, OF CHICAGO, ILLINOIS

## DOORCHECK

Application filed September 29, 1928. Serial No. 309,251.

This invention relates to a door check and has for its object the production of a simple mechanism for retarding the motion of the door to prevent slamming. The construction and operation of the device will be understood from the following description together with the accompanying drawings in which,—

Fig. 1 shows a perspective side view of the check; Fig. 2 a top plan view showing the position of the parts when the door is closed in full lines and the position of the parts when the door is open in dotted lines; Fig. 3 is a horizontal section taken on the line 3 of Fig. 1 showing a detail of the spring mechanism used to check the motion of the door immediately before final closing; Fig. 4 is a vertical section taken on line 4 of Fig. 2; Fig. 5 is a horizontal section, taken on line 5 of Fig. 4, showing a detail of the spring urging member; Fig. 6 is a horizontal section, taken on line 6 of Fig. 4, showing a detail of the clutch mechanism; Fig. 7 is a bottom plan view of the check with the door closed; Fig. 8 is a bottom plan view of the check with the door open; Fig. 9 is a vertical section of the braking mechanism taken on line 9 of Fig. 10; and Fig. 10 is a section of the same mechanism taken on line 10 of Fig. 9; Fig. 11 is a vertical section showing another form of the braking mechanism.

Referring in detail to the drawings: 1 represents a metal casing which is screwed to the upper corner of the door and serves as a housing for the checking mechanism; 2 is a shaft projecting vertically through the casing 1 and is rigidly secured to the arm 3. The arm 3 is pivotally connected with the yoke 4 which in turn slidably engages rod 5 secured to the upper panel of the casing as shown in Figs. 1, 2 and 3. A spring 6 serves to cushion the sliding of yoke 4 on rod 5 when the door approaches its limiting open position, and a spring 7 serves a similar purpose when the door approaches its limiting closed position.

A mechanism for holding the door open a slight distance is shown in detail in Fig. 3. It comprises a rectangular housing 9 slidably mounted on rod 5, and enclosing a spring 10 coiled about rod 5 and adapted to slide there-

on. A lever 11, pivotally mounted in the housing 9, has an opening 12 through which rod 5 passes. The lever is normally held by spring 10 in an inclined position, but when it is desired to set the housing 9 at any point along rod 5 the lever is merely pressed against spring 10 whereupon the shoulder of the opening 12 is removed from engagement with rod 5. A slight additional pressure on the door will slide the entire housing 9 along rod 5, the mechanism being merely designed to yieldingly hold the door open at any degree to allow ventilation.

The check is connected to the door frame by the arm 3 which carries a pawl 13 which engages the rotatable member 14 when the door is being opened. Member 14 is mounted loosely on shaft 2 and is journaled in a bearing 14<sup>a</sup> in the housing 1. A coiled spring 16 is fastened at one end to housing 1 and at the other end to rotatable member 14 so that upon opening of the door the member 14 is turned against the tension of the spring.

By slidably mounting arm 3 on rod 5 there is less relative movement between shaft 2 and the door than in the ordinary elbowed type of connecting arm, and hence less strain upon main spring 16. Also the swing of the door is limited by the length of rod 5, a positive check on the opening swing being reached when yoke 4 slides along sufficiently to compress spring 6 to its limit. By lengthening or shortening rod 5 any desired extent of swing may be attained.

Mounted on shaft 2 and immediately below the member 14, is a gear 15. The periphery of gear 15 is toothed and meshes with worm gear 15<sup>a</sup> journaled in the side walls of the housing 1 as shown at 17 in Fig. 6. Below gear 15, and rigidly mounted on shaft 2, is a cam member 18 carrying a cam 19 on its periphery which engages a brake shoe lever 20, the action of which will be subsequently explained.

As pointed out, cam member 18 rotates with shaft 2, while gear 15 is loose on shaft 2. The rotation of gear 15 is effected by a roller clutch mechanism shown in detail in Fig. 6. This clutch arrangement comprises a plurality of vertical rollers 15<sup>b</sup> positioned in

notches cut in the periphery of a downwardly projecting flange portion of gear 15, and held between the sides of the notches and the inside surface of an upwardly projecting flange portion of cam member 18. When the door is opened cam member 18 turns with shaft 2 and gear 15 is stationary, but upon closing the tendency of the rollers 15<sup>b</sup> is to wedge themselves between the notch and flange surfaces and to turn gear 15 with cam member 18 and shaft 2.

Springs 15<sup>c</sup> serve to keep the rollers 15<sup>b</sup> in contact with both the notch surface cut in gear 15 and the inside flange surface of cam member 18. A bearing 21 is placed between shaft 2 and the underside of the housing 1 to allow the shaft to turn in the housing.

The governor mechanism, now to be described, is actuated by gear teeth on the periphery of gear 15, which, as previously stated, mesh with the worm gear 15<sup>a</sup>. A gear wheel 22 turns with worm gear 15<sup>a</sup> and meshes with a second worm gear 23 cut in shaft 24. Shaft 24 is vertical and parallel to shaft 2 and is journaled in bearings 25 resting in the upper and lower walls of the housing 1. Shaft 24 carries a felt disc 26 and a governor 27 adapted to move the disc vertically away from brake shoe 28 as its speed of rotation decreases.

Figs. 9 and 10 show the governor mechanism more in detail. The governor 27 comprises a metal plate 46 to which are pivotally connected governor arms 29 carrying metal balls at their outer ends. Springs 30 abutting against flanges on the sides of plate 46 serve to push the governor arms toward the center of the plate. Each governor arm has an arm 31 pivotally secured to its under surface, the other ends of the arms 31 being pivotally secured to a metal plate 32 which forms a backing for felt disc 26. It will be clear that as the shaft 24 accelerates the centrifugal force throws arms 29 outwardly against the pressure of springs 30. This in turn tends to move arms 31 into a vertical position resulting in a movement of the felt disc 26 downwardly into engagement with brake shoe 28.

A greatly simplified form of governor is shown in Fig. 11. In this form, shaft 24 carries a two or three ply felt disc 33 which normally rests in contact with the rounding top of brake shoe 34. As shaft 24 accelerates the centrifugal force tends to flatten the felt disc and increase the frictional contact with the brake shoe. This form of governor may be used in lieu of that shown in Figs. 4, 9 and 10, it being understood that in such case the brake shoe 28 shown in Fig. 4 will be of the form shown at 34, Fig. 11.

The retarding effect should be removed just before the door reaches the closed position to allow sufficient momentum to overcome the resistance of the latching mechanism.

This is accomplished by the cam 19 which is adapted for engagement with a cam shoe on the lower end of brake shoe lever 20. Just prior to closing the cam comes into engagement with the cam shoe depressing it and pivoting lever 20 about pivot 35 to remove brake shoe 28 out of contact with felt disc 26. A set screw 36 permits adjustment of the brake shoe lever. It will be understood that this final release of the brake shoe is fairly gradual so that no appreciable jerk occurs, the door swinging smoothly to closed position.

The operation of the checking mechanism takes place in the following manner: Upon opening the door, pawl 13 turns rotatable member 14 against the spring 16. Gear 15 remains idle during the opening swing and cam member 18 carrying cam 19 turns with shaft 2. Upon reversal of the swing into the closing direction the ball clutch mechanism grips gear 15 revolving it with cam member 18 and shaft 2. The motion of gear 15 is in turn imparted to the governor mechanism 26 and 27 through the gearing 15<sup>a</sup>, 22, and 23. As the closing position is approached the brake shoe 28 is lowered out of contact with disc 26, the retarding effect produced by such contact being thus removed to allow the door to close against the latching mechanism.

It is desirable to provide mechanism for securely fixing the door in any given position along its arc of swing. This is accomplished in the present invention by means of a rotatable arm 37 secured to the underside of the housing 1 and carrying a boss 38. An annular disc 39 has a series of notches 39<sup>a</sup> cut in its periphery which engage the end of the boss 38. The disc 39 encompasses an inner disc 40 which is loose on shaft 2 and carries a pointed pin 41, the point of which slides into a notch cut in the inner surface of disc 39. A boss 42 projects from the periphery of disc 39 and strikes a stop 43 on the lower face of the housing, thereby limiting the movement of disc 39 relative to housing 1.

A bottom plate 44 turns with shaft 2 and is keyed thereto by a screw 45. This plate is eccentrically located on shaft 2 so that it will strike the boss 47 on disc 39 at a predetermined point to hold the door in its opened position. Upon turning arm 37 to remove boss 38 out of engagement with notch 39<sup>a</sup> the door is free to close.

The invention affords a simple and satisfactory mechanism for controlling the swing of a door and for holding the door in any given position either yieldingly or fixedly, as may be desired.

A spring 100 is provided to hold the lever 20 in position.

The foregoing detailed description has been given for clearness of understanding

only and no unnecessary limitations should be understood therefrom, but the appended claims should be construed as broadly as permissible, in view of the prior art.

5 What I regard as new, and desire to secure by Letters Patent, is:

1. A device of the character described including a spring urged rotatable member; means for retarding rotation of said member including a rotatable governor member with a brake shoe in frictional contact therewith; and means controlled by rotation of the spring urged member for lessening the retarding action, said means including a cam carried by the rotatable member and a cam shoe riding on said cam, said cam shoe being rigidly connected with said brake shoe; and locking means for fixedly holding said spring urged rotatable member at a predetermined point.

2. In a device of the character described, a retarding mechanism including a rotatable flexible governor member, and a brake shoe in frictional contact therewith, said flexible governor member adapted to be flattened out by centrifugal force to increase frictional contact between said governor member and said brake shoe.

In testimony whereof I have hereunto set my hand this 19th day of September, 1928.

BERNARD SUMMERFIELD.

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