

May 27, 1930.

W. F. HENDRY

1,759,846

DOORCHECK

Filed Sept. 21, 1927

2 Sheets-Sheet 1

Fig. 3.

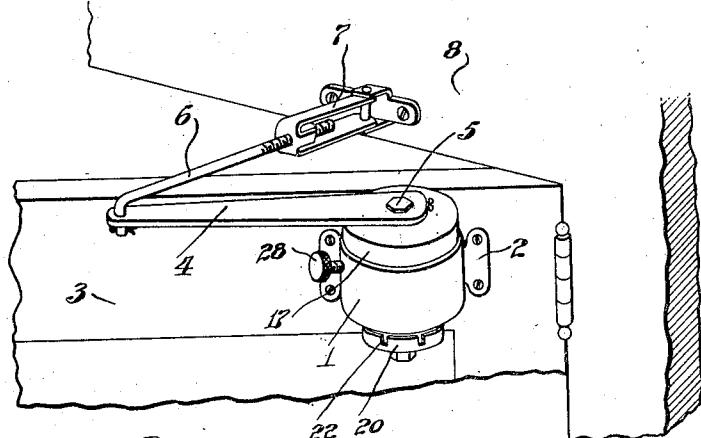


Fig. 2.

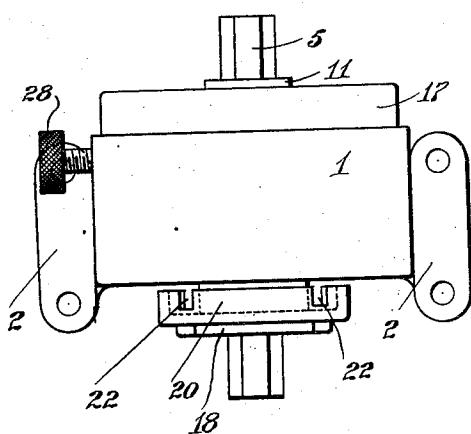


Fig. 1.

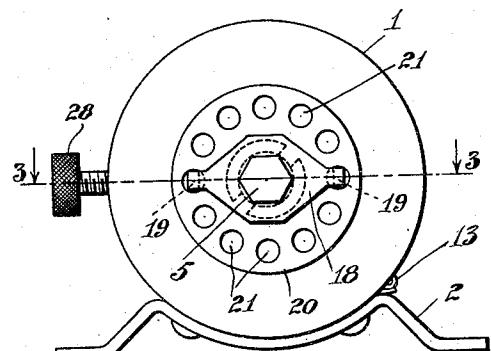
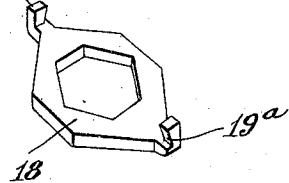


Fig. 7.



INVENTOR
W. F. Hendry
BY Panasolich
ATTORNEY

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2 Sheets-Sheet 2

Fig. 5.

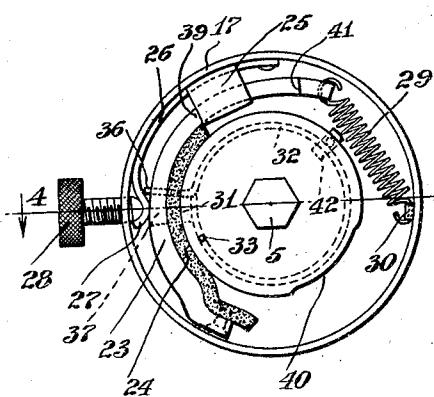


Fig. 4.

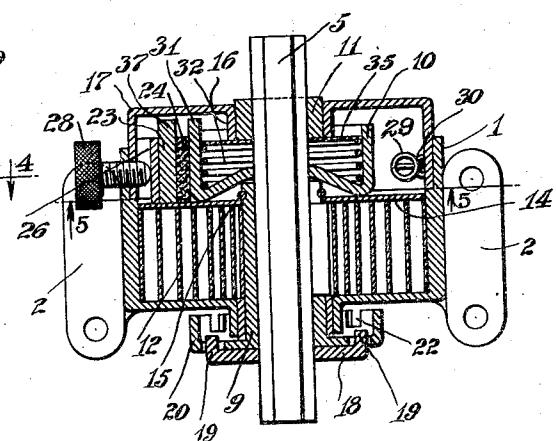


Fig. 6.

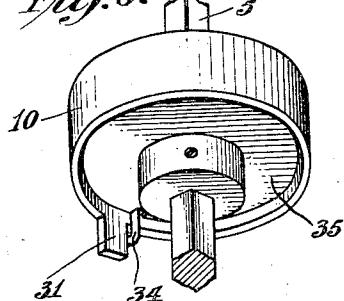
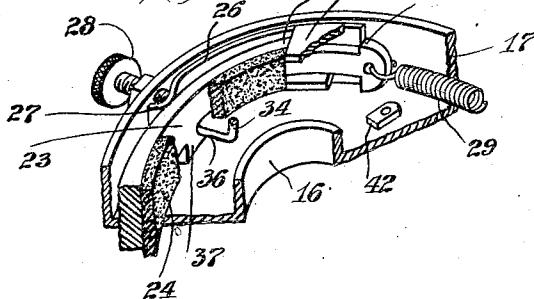


Fig. 8.



INVENTOR
W. F. Hendry
BY *Pennard*
ATTORNEY

UNITED STATES PATENT OFFICE

WILLIAM F. HENDRY, OF OSSINING, NEW YORK, ASSIGNOR TO MANHATTAN ELECTRICAL SUPPLY COMPANY, INC., OF NEW YORK, N. Y., A CORPORATION OF MASSACHUSETTS

DOORCHECK

Application filed September 21, 1927. Serial No. 221,001.

This invention relates to a modification of or improvement in the type of door check disclosed in the United States Patent #1,671,614 granted to Henry Smith, May 29, 1928.

5 The door check disclosed in the above mentioned application consists of a rotatable drum, an abutment and a wedge which is so positioned as to be drawn in between the abutment and the drum when the drum is rotated 10 in one direction, due to the closing of the door to which the door check is attached, and thus introduce a braking action which causes the door to shut very slowly under the influence of the usual door closing spring, 15 which is associated with the door check.

It is sometimes desirable to have a door close quickly for a portion of its travel and then to be checked sufficiently to prevent slamming, just before the door reaches a 20 closed position. This is particularly true of screen doors where it is desired to keep out insects.

The object of my invention is to so modify the construction of the door check disclosed 25 in the above mentioned application as to permit a door upon which such a check is mounted to close rapidly up to a certain angle and then to close slowly under the influence of the braking action of the check in 30 the same manner that it would if controlled by a hydraulic or pneumatic check.

This and other objects and advantages and the manner of accomplishing them will be 35 more clearly understood by reference to the following description and the accompanying drawings.

In the drawings Fig. 1 illustrates a plan view of a door check constructed in accordance with my invention.

40 Fig. 2 is a view in elevation of the door check shown in Fig. 1.

Fig. 3 illustrates the door check as it is applied to a door.

45 Fig. 4 is a sectional view of the door check taken along line 3—3 of Fig. 1. This view also corresponds to a section taken along section lines 4—4 of Fig. 5.

50 Fig. 5 is a plan view of a portion of the door check showing the braking mechanism. This

view is taken in the direction indicated by the arrows 5—5 of Fig. 4.

Fig. 6 is a perspective view of the brake drum illustrated in Fig. 5.

Fig. 7 is a detailed view of a portion of the 55 spring tension adjusting means of the door check.

Fig. 8 is a perspective view of a section of the door check showing the braking wedge and its accompanying parts.

60 In the drawings reference numeral 1 indicates the housing of the door check, 2 a bracket secured to housing 1 for attaching the door check to a door. As shown in Fig. 3 the door check is attached to a door 3 by means of the 65 bracket 2 and is operated through the action of a lever arm 4 attached to the rotatable shaft 5 of the door check. Interconnected with the lever arm 4 is a rod 6 which is adjustably attached to a hinged support 7 mounted 70 on the door jamb 8.

75 The door check consists of a housing 1 having a cover 17 which encloses a rotatable shaft 5 mounted within a sleeve 9 and having secured thereto a brake drum 10 and a bearing member 11. Mounted around and attached at one end, to sleeve 9 is a flat spring 12, which spring is connected at its outer edge to the housing 1. The spring may be secured to the sleeve 9 by means of a hook in the end 80 of the spring and a cooperating slot in the sleeve and may be secured to the housing 1 in like fashion, as shown at 13 (Fig. 1). Placed between the spring 12 and the brake drum 10 is a flat spacing washer 14 which serves merely to keep oil which may be placed on the spring 12 from getting on the brake drum. In order to hold the sleeve 9 in its proper position a small spring wire key 15 is provided. The bearing member 11 which is fastened to 90 shaft 5 is journaled within an inwardly turned portion 16 of the cover plate 17 of the housing 1. In order to interconnect the sleeve 9 to the shaft 5 so that the shaft when it is rotated will be influenced by the action of the spring 12, a key member 18 is mounted on the shaft 5 and is prevented from turning thereon due to the fact that the opening in the key member is made the same shape and size 95 as the shaft 5. This key, while it is not free

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to turn on the shaft is freely movable longitudinally of the shaft and serves, by means of projections 19 thereon, to interlock with a flange portion 20 of the sleeve 9, which flange portion is provided with a series of perforations or notches 21 within which the projections 19 fit. When the door check mechanism is placed in its operating position on the door, as shown in Fig. 3, the lever arm 4 is secured to the shaft 5 and to the rod 6, after which the key 18 is withdrawn from engagement with the flange portion 20 and the sleeve 9 rotated against the action of spring 12 by suitable means such as spanner wrench which 5 may be used to engage cut out portions 22 in the flange member 20. After the sleeve 9 has been rotated sufficiently to give the desired 10 spring tension the key 18 is pushed into engagement with the flange 20 so that the projections 19 on the key fit within the perforations 21 in the flange 20. The key is prevented from slipping out of engagement by the particular shape of the projections 19, which are made wider at the free end than 15 at the base, as shown at 19^a, so as to grip the sides of the perforations 21 securely. It will thus be seen that in the manner just described the spring tension tending to close the door to which the check is attached can be adjusted 20 to operate the door in any desired manner or to operate different weight doors. In order to adapt the check to doors of different sizes the rod 6 may be screwed in or out of its seat in hinge member 7.

30 The action of the spring 12 is to tend to close the door at a particular velocity depending on the tension to which the spring 12 is adjusted. In order to prevent the door from slamming shut under the influence of the spring 12 a brake drum 10 has been provided. Cooperating with the brake drum 10, which 35 is secured to the shaft 5, is a brake shoe or wedge 23. This brake shoe is tapered slightly and has secured to the face thereof in a suitable manner, for example, by riveting, a piece 40 of braking material 24, such as leather or ordinary automobile brake lining of any well known type. The taper of the shoe should be small in order to secure best results, for example, a taper of about a thirty-second of an 45 inch for an inch length of shoe has been found to give good results. The shoe or wedge 23 is preferably shaped to conform to the curvature of the brake drum 10 and is slidably 50 mounted within a pair of guides 25 which are integral with member 26 attached to the cover 17 by riveting or welding or in any other suitable manner, at one end only. The shoe 55 is narrowed at its point of contact with the guides, so that excessive movement of the shoe in the guide is prevented by the full width portions 39 and 41, of the shoe striking against the sides of the guides. The free end of the member 26 is curved slightly as shown at 27 to form an abutment

which rests against a thumb screw 28 passing through the cover 17. The brake shoe 23 contacts with the abutment 27 of the member 26 and is drawn in between the abutment and the surface of the brake drum 10 by means of a coil spring 29 which is attached to the end of the brake shoe and to the cover 17, as shown at 30. Integral with the rim of the brake drum 10 which is shown in an inverted position in Fig. 5 for clarity is a projection 31 and mounted inside the brake drum is a coil spring 32 which is secured at one end to the drum 10, for example, by inserting the end of the spring in a perforation in the drum, as shown at 33 and at the other end is bent outwardly past the projection 31, as shown at 34 and 36 (Fig. 8) and is properly tensioned to press against the projection 31. In order to keep the spring 32 in its proper position inside of the brake drum a washer 35 is provided. This washer rests against the spring 34 and is held in its proper place by the bearing member 11. The outwardly bent portion 36 of the spring 32 engages with a projection 37 of the brake shoe 23 (Figs. 5 and 8). The portion 36 is not all the time in engagement with the projection 37, however, as will be explained more in detail hereinafter. The operation of the door check is as follows: When the door is in its fully opened position the shaft 5 will have been rotated against the action of spring 12 as an incident to the opening of the door and hence will tend to be rotated by the spring 12 in such manner as to close the door. When the door is released from its open position and allowed to close under the action of the spring 12 the shaft 5 rotates carrying with it the brake drum 10. The brake drum rubs against the braking surface 24 of the brake shoe 23, which is drawn into engagement with the brake drum through the action of the coil spring 29, and acts to rotate the brake shoe 23 in the same direction as the drum is rotating. This rotation of the brake shoe tends to wedge the brake shoe the more tightly between abutment 27 and the drum 10 due to the fact that the shoe is tapered, as stated heretofore. The result is that the brake shoe is wedged tightly between the abutment and the drum and consequently serves to retard the rotation of the drum due to the friction between the brake surface 24 and the drum 10. In order to prevent the brake shoe 23 from wedging too tightly between the abutment and the brake drum a portion of the brake shoe is arranged to form a stop 39 which abuts against the guide 25 and prevents further movement of the brake shoe. The amount of retarding force exerted by the brake shoe and drum is regulated by adjusting the thumb screw 28 to vary the distance between the abutment 27 and the brake shoe 10.

Without taking into consideration the action of the spring 32, it will be seen that when the fully opened door is released and allowed to close under the action of the spring 12 that the rotation of the brake drum 10 will cause a braking action to be exerted by the brake shoe 23, which braking action will control the closing motion of the door and cause it to shut gently at any desired velocity. As in some cases it may be desirable to adjust the braking action of the door check so that the door closes very slowly, it may be found that the door will not latch itself. In order to insure the latching of the door even when the door is closed very slowly a mutilation section 40 is provided in the drum 10. This mutilation 40 is so positioned that just before the door reaches a latching position the mutilation comes into a position opposite the brake shoe 23, which reduces the pressure between the shoe and drum and causes braking action to be released and in turn permits the door freely to close under the action of the spring 12. Where such a mutilation is provided the movement of the door is retarded up to a position just before the door latches, then the door is immediately snapped shut under the full and unretarded action of the spring 12. It is preferable with this type of door check to make the tension of the door closing spring 12 just sufficient to latch the door against latch friction, etc.

As it is desired in some cases, for example where the door check is used with screen doors to keep out the insects, to close the door quickly for the major portion of its travel, then slow it up sufficiently so that it does not slam, the spring 32 and its cooperating parts have been provided. When the door is opened from a closed position the projection 36 of the spring 32 moves, as a result of the rotation of the brake drum 10, until it contacts with the projection 37 of the brake shoe. As soon as it reaches this position, due to the initial tension of the spring 32, it withdraws the brake shoe slightly from its position between the abutment 27 and the brake drum 10, against the action of the coil spring 29. Upon rotation of the brake drum, as an incident to the opening of the door, the spring still further withdraws the brake shoe from its position, and so in order to prevent too great a movement of the brake shoe a stop 41 is provided at the end of the shoe. This stop strikes against the guide members 25 and prevents too great a movement of the shoe under the influence of the spring 32. After the door has been fully opened and allowed to close the drum 10 rotates freely without retardation from the brake shoe until the projection 31 on the drum comes into engagement with the end 36 of the spring 32. As soon as this engagement occurs the end 36 of the spring is rotated along with the drum, thus permitting the brake shoe to be

drawn in between the abutment and drum under the action of the spring 29. As the shoe is now in contact with the drum 10 a braking action will be exerted and the rotation of shaft 5 and corresponding moving of the door, will be retarded in such manner as to cause the door to close gently during the remaining portion of its movement. When a mutilation 40 is provided on the drum 10, the door closes gently, as just stated, until the mutilation reaches the friction wedge 11, when the braking action will be released and the door snapped shut under the free action of spring 12. The projection 31 may be placed at any desired position on the drum 10 and hence the door can be permitted to close freely up to a point just before it latches and then be caused to slow up sufficiently so that it does not slam, or the projection can be so positioned that the door swings freely for but a small portion of its travel and then moves slowly under the retarding action of the brake shoe.

From the foregoing description it will be seen that the spring 12 is wound up a predetermined amount when the check is in its operative position on a door. Should it be desired for any reason, such as inspection, or repair, to remove the check from the door without allowing the spring to unwind completely, a stop 42 might be secured to the housing 1 in a suitable position. The projection 31 on drum 10 would, when the check was removed from the door, due to the uncoiling of spring 12, abut against the stop 42 and prevent further uncoiling of the spring.

The action of spring 32 is such that it will also tend to shut the door up to the point where the shoe 23 is allowed to exert its braking action. This feature aids in the carrying out of the closing operation as above described, for the reason that the spring tension tending to close the door 7 during the free portion of its swing is greater than that tending to close it after the braking action is exerted.

It will be seen that the above disclosed simple friction check can be adjusted to act in exactly the manner that a hydraulic or pneumatic check does, and without the fluids, cylinders, pistons and valves used in such devices.

It is to be understood that while I have described, for the purpose of illustration, a particular embodiment of my invention, I do not intend to be limited thereto, as various modifications and adaptations such as would occur to one skilled in the art may be made without a departure from the spirit of the invention, as set forth in the following claims.

What I claim is:

1. In a damping means for oscillating bodies, a rotatable drum, a stationary abutment and a wedge movable to a position between the drum and the abutment, a spring

for thrusting the wedge between the drum and abutment and means attached to the drum for opposing the action of said spring and maintaining the wedge out of engagement with the drum.

5. 2. In a door-check, a rotatable drum, a stationary abutment and a wedge movably positioned between the drum and the abutment, means tending to thrust the wedge between the drum and the abutment and means operable by the drum for maintaining said wedge out of engagement with the drum during a portion of the rotation of the drum.

15. 3. In a door-check, a rotatable drum, a stationary abutment and a wedge movably positioned between the drum and the abutment, means tending to thrust the wedge between the drum and the abutment and a spring attached to the drum for maintaining said wedge out of engagement with the drum during a portion of the rotation of the drum.

25. 4. In a damping means for oscillating bodies, a rotatable member, a stationary abutment and a wedge positioned between the member and the abutment, means tending to thrust the wedge between the member and the abutment, and means responsive to rotation of the said member for maintaining said wedge out of engagement with said member during a portion of the rotation of said member.

35. 5. A door-check comprising a rotatable member, an abutment and a wedge positioned between the member and the abutment, a spring tending to thrust the wedge between the member and the abutment, a spring arm operable by said member, and forcibly engaging a projection on said wedge so as to maintain said wedge out of engagement with said member, and a projection on said member for disengaging said arm from the projection on said wedge at a given angular position of said member.

45. 6. In a door-check, a rotatable member, a main spring for said member, a brake associated with said member, auxiliary spring means for assisting the rotation of said rotatable member and means for simultaneously rendering said auxiliary spring means ineffective and said brake effective.

55. 7. In a door-check, a shaft, movable responsive to swinging of the door, a brake including a friction member for retarding swinging of the door, said member being normally held in braking position under pressure, and means mounted on said shaft for reducing the said pressure and relieving the braking action of said member during a portion of the swing of said door.

60. 8. In a door-check, a shaft movable responsive to swinging of the door, a brake including a friction member for retarding swinging of the door, a spring arm for engaging said member and rendering it inoperative to retard said door during a portion of the

swing of said door and means secured to said shaft for disengaging said arm and said member during the remainder of the swing of the door to allow said member to retard said door.

70. 9. In a door-check, a friction brake normally in operative condition, means for retarding swinging of the door and spring means, responsive to the swinging of the door to a certain predetermined position, for preventing said brake means from acting during a portion of the swing of the said door.

75. 10. A door-check adapted to close a door in a desired manner, comprising a brake for retarding the closing of the door and means including a spring arm responsive to the swinging open of the door to a certain position, for rendering said brake ineffective during the initial portion of the closing swing of the door.

80. 11. A door-check adapted to close a door in a desired manner, comprising a brake for retarding the closing of the door and means including a spring arm responsive to the swinging of the door between certain limits, for rendering said brake ineffective during the corresponding portion of the closing swing of the door, said spring arm serving to assist in closing the door during the said initial portion of its swing.

85. 12. A mechanism adapted to close a door, comprising a brake including a frictional member for retarding the swinging of the door, means for maintaining said member in an inactive position during the initial portion of the closing swing of the door and to place said member in an active position during the remaining portion of the swing of the door, and separate means for rendering said member inactive in another position of the door.

90. 13. In a door check, a friction brake, means for retarding swinging of the door and means comprising a spring arm responsive to the swinging of the door, for preventing said brake means from acting during a portion of the swing of said door and separate means for preventing said means from acting during another portion of the swing of the door.

95. 14. In a door check, a rotatable drum, a stationary abutment and a friction wedge movably positioned between the drum and the abutment for exerting a braking action, means tending to thrust the wedge between the drum and the abutment, means responsive to rotation of the drum for maintaining said wedge out of engagement with the drum during a portion of the rotation of the drum and a mutilation on said drum for preventing said wedge from exerting a braking action during a portion of the rotation of the said drum.

100. 15. In a brake means, a rotatable drum, an abutment, a friction wedge positioned between said drum and said abutment, a pair of guides for said wedge and stops on the

wedge for limiting longitudinal movement of the wedge relative to the guides.

16. In a door check a hollow brake drum having a rim with a projection thereon, a coiled spring positioned concentrically within the drum having one end attached to the drum and the other end projecting out by the rim of the drum so as to be engageable by the said projection.

10 In testimony whereof, I have signed my name to this specification this 20th day of September, 1927.

WILLIAM F. HENDRY.

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