Aug. 24, 1926.

1,597,274

E. W. F. HERRMANN

DOORCHECK

Filed June 30, 1924

2 Sheets-Sheet 1

FIG. 1.

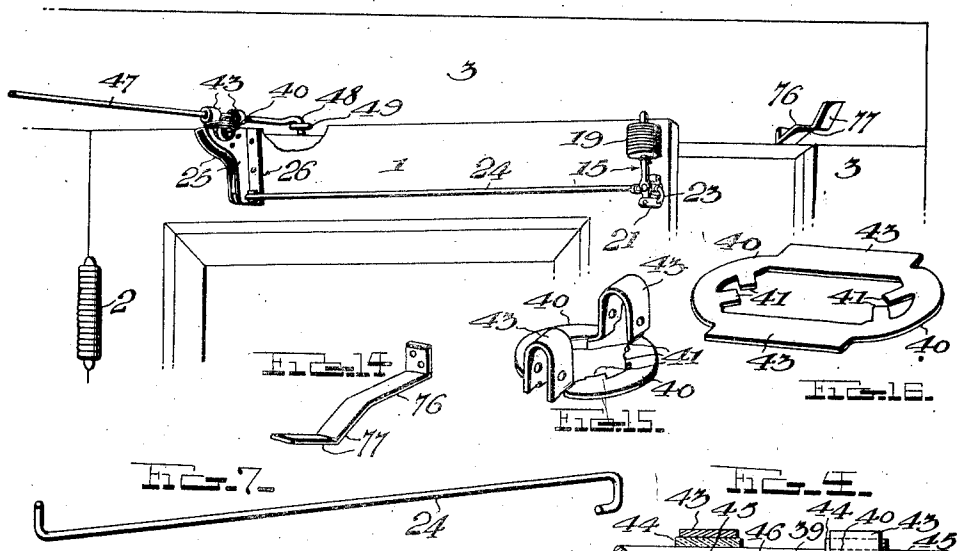


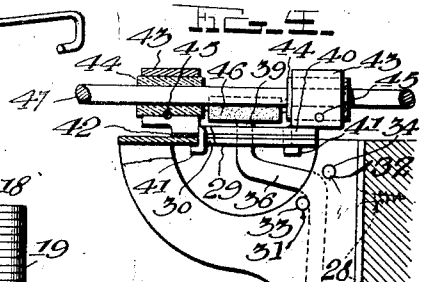
FIG. 14.

FIG. 15.

FIG. 16.

FIG. 7.

FIG. 4.



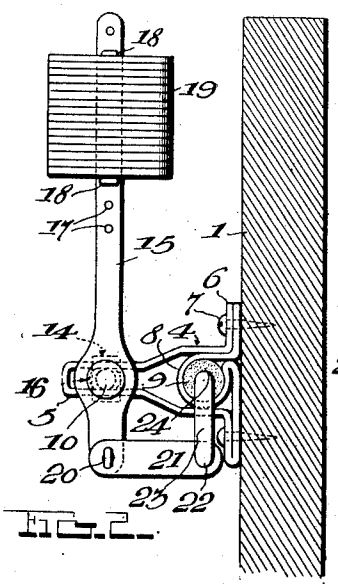
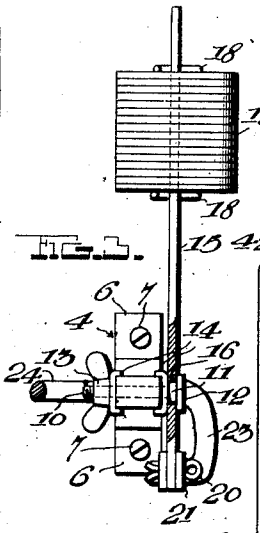


FIG. 2.

FIG. 3.



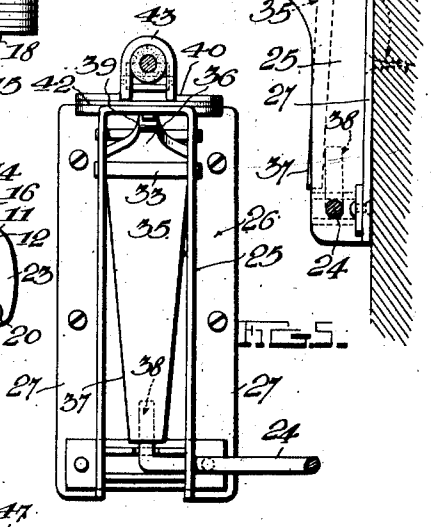


FIG. 5.

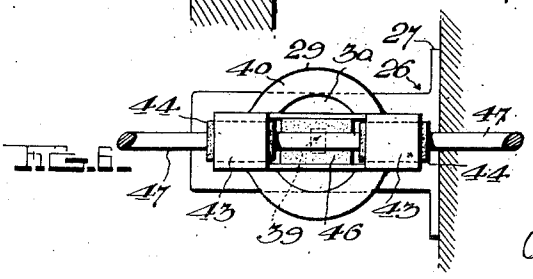


FIG. 6.

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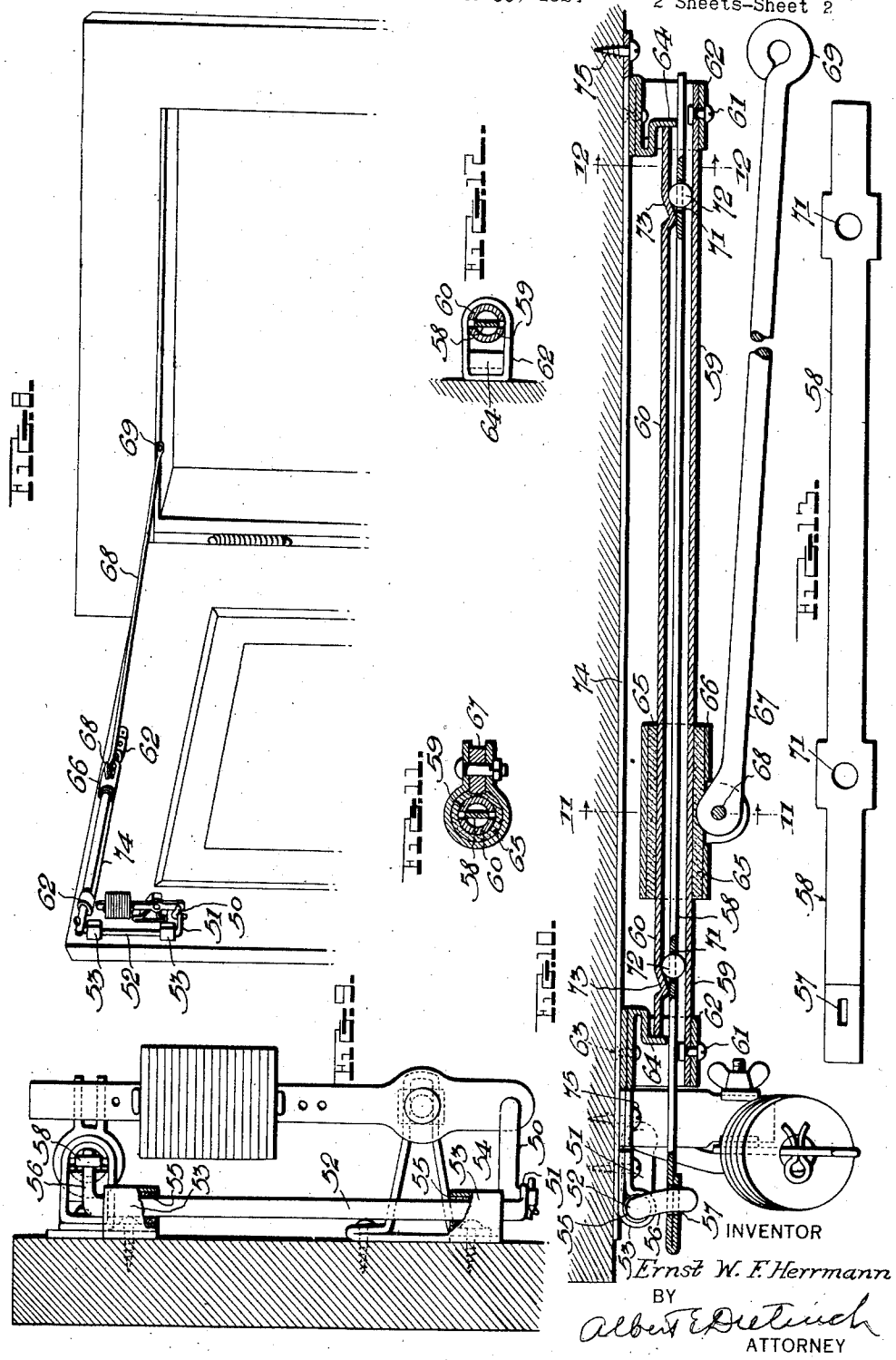
1,597,274

E. W. F. HERRMANN

DOORCHECK

Filed June 30, 1924

2 Sheets-Sheet 2



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Patented Aug. 24, 1926. 1,597,274

UNITED STATES PATENT OFFICE.

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DOORCHECK.

Application filed June 30, 1924. Serial No. 723,305.

The invention relates to door checks and has for its general object to provide means for so braking the closing action of a door upon which it is cooperatively mounted as to prevent slamming of the same.

The invention further generally seeks to provide a device of the class described which is of a simple structure, economic to manufacture, and having few parts all of which are constructed and cooperatively arranged to coact in efficiently performing their desired function with a minimum amount of strain, wear and danger of breakage.

The invention further resides in providing a structure of the class stated in which all wearing parts are so constructed and arranged as to be readily removable for replacement with a minimum amount of labor and expense.

The invention still further resides in the provision of means whereby the checking or braking action of the device is "governor lever" controlled and may be neutralized just at the consummation of the closing movement of the door so that the same may freely complete its movement to the absolute closed position, thus preventing interference with spring catch appliances with which the door may be equipped, such as a night-latch or the like.

With the above and other objects in view, the invention still further resides in those novel details of construction, combination and arrangement of parts, all of which will be first fully described, then be particularly pointed out in the appended claims, reference being had to the accompanying drawings, in which:—

Figure 1 is a detail perspective view illustrating the application of the invention.

Figure 2 is a side elevation of the brake control or governor mechanism.

Figure 3 is a front elevation of the parts shown in Figure 2.

Figure 4 is a side elevation of the brake mechanism carrying bracket and the mechanism carried thereby, the door being shown in section.

Figure 5 is a front elevation of the parts shown in Figure 4.

Figure 6 is a plan view of the parts shown in Figure 4.

Figure 7 is a detail perspective of the operating or crank rod, per se.

Figure 8 is a detail perspective view illustrating the application of a modified form of the invention.

Figure 9 is a side elevation of the modified arrangement of brake control or governor mechanism shown in Figure 8.

Figure 10 is a plan view showing the application of the invention, the braking or check elements being shown in horizontal section.

Figure 11 is a detail cross section taken on the line 11—11 on Figure 10.

Figure 12 is a view similar to Figure 11, taken on the line 12—12 of Figure 10.

Figure 13 is a plan view of the brake or check applying bar.

Figure 14 is a detail perspective view of the brake action neutralizing spring member.

Figures 15 and 16 are detail perspective views illustrating the turn table and the blank from which it may be formed respectively.

In the drawings, in which like numerals of reference indicate like parts in all of the figures, 1 indicates the door which is swingable on spring hinges 2, and the door frame 3.

A governor lever supporting bracket 4 is secured to the face of the door adjacent the top outermost corner thereof and may be bent up from a single sheet of strip metal to include an elongated loop bearing portion 5, securing feet 6 adapted to be secured to the door portion by wood screws 7, and a circular rod bearing portion 8. In practice, the rod bearing portion 8 will be fitted with a suitable bearing sleeve 9 constructed of fibre, or other suitable material, such as will provide a noiseless bearing.

A pivot bolt 10 is provided and adapted to pass through the loop bearing portion 5, and the said bolt is constructed to include a pivot forming portion 11, and a bearing or stop head 12, being also suitably threaded at its end to accommodate the wing nut or thumb screw securing member 13. By reason of constructing the bolt 10 as described it will be readily apparent that the said bolt is slidable back and forth through the length of the loop bearing 5, and for aiding in the securing of the said bolt to a desired adjustment along its movable bearing square washer members 14 are provided one at each side of the loop portion 5 and lapping over the edges thereof so as to prevent rotation.

When an adjustment is made, the securing member 13 is loosened and the bolt adjusted to the desired position along the said loop bearing when the said securing member will be again screwed home or forced to act upon the said square washers 14 to thereby secure the pivot bolt to the said adjusted position. It will be observed that the pivot forming portion 11 of the bolt 10 is of larger diameter than the remainder of the shank thereof so as to provide a shoulder for engaging the adjacent washer 14 to take up the thrusts set up by the screwing action in a manner for providing a free pivot without danger of binding during the securing action.

A governor lever in the nature of an upright pendulum 15 is pivoted upon the pivot portion 11 of the pivot bolt in a manner for being swingable in a vertical plane transversely of the plane of movement of the door. The lever 15 is provided with a relatively long horizontally disposed slot 16 which surrounds the said pivot forming portion of the bolt 10 to provide a lost motion pivot for the said lever. By reference to Figure 2 of the drawings, it will be observed that the governor lever 15 comprises an upper long end and a lower short end, the long end of the lever being provided with a plurality of adjusting holes 17 through which cotter pins 18 pass to thereby be readily adjustable to position. The cotter pins 18 serve as a removable and adjustably securing means for the counterweight forming washers 19, a plurality of which surround the lever 15 at the long end thereof in a manner for providing a suitable counterweight, the purpose for which will soon appear.

The short end of the lever is pivotally connected at 20 to a link 21, which is in turn, pivoted as at 22 to the crank portion 23 of the brake actuating crank rod 24 horizontally oscillatable in the bearing sleeve 9, hereinbefore referred to, and in a suitable bearing provided therefor in one of the side or bearing wings 25 of the brake mechanism supporting bracket 26.

The brake mechanism supporting bracket 26 may be bent up from a single sheet of metal to include the side or bearing wings 25, and securing feet 27 adapted to be secured to the door face by the wood screws 28 at a point adjacent the uppermost edge thereof and suitably spaced between the hinge connection and the outer edge of the said door. The said bracket is also stamped and shaped to include a circular horizontally positioned turn-table bearing 29 having a large central aperture 30 and the side wings 25 are provided with opposing bearing pin apertures 31 and securing pin receiving apertures 32, the purpose for all of which will be later explained.

A suitable bearing providing pin 33 is secured across between the side wings 25 and in the apertures 31 and a securing pin is similarly mounted in the apertures 32, and the said pins provide a suitable bearing, and a means for securing to position, a brake operating lever 35 which includes the angled portion 36 for resting upon the bearing pin 33 in a pivotal manner and in position for being secured to that manner of mounting, while being sufficiently free to move, by the securing pin 34. The brake operating lever 35 includes the pendent arm 37 which projects downwardly from the pivotal connection into the path of movement of the crank 38 of the oscillatable actuating rod 24 hereinbefore described, and the upper end of the said lever terminates in an upwardly angled extension 39 which passes through the aperture 30 of the turn-table 29 and is adapted to engage the brake shoe hereinafter again referred to.

A turn-table 40, in the nature of an annular ring, is horizontally rotatably mounted upon the turn-table bearing 29, the said turn-table being provided with downwardly extended and angularly bent securing fingers 41, which engage the inner annular edge of the said bearing member in a manner for securing the parts together in rigid relation. A suitable packer disk 42 may be interposed between the turn-table parts to provide a noiseless bearing. The turn-table is preferably formed from a single sheet of metal shaped up to form hubs 43, each of which is equipped with a bearing sleeve 44 of fibre, or other material, for providing a noiseless bearing, and which said sleeves are secured, as at 45, to secure them within the said hubs in a removable manner for permitting ready replacement thereof when worn. The brake shoe is indicated by the numeral 46 and the said element rests upon the engaging end 39 of the brake operating lever 35 within the aperture 30, and may, of course, be constructed of any suitable material such as leather, brake lining, brass, etc.

A check rod 47 is provided and is adapted to have the free end thereof pass slidably through the sleeves 44 of the hubs 43 and to have one end thereof angularly bent as at 48 to be pivotally connected with the screw eye 49 secured to the top bar of the door frame 3. Thus, one end of the check rod is pivotally secured to the fixed support or door frame and the other end freely slidable through the bearings above stated and in a manner for being acted upon by the brake shoe 46 when the brake operating lever 35 is rocked to apply the brake shoe in a manner later to be described.

The foregoing is a description of the parts illustrated in Figures 1–7 inclusive of the drawings, and comprehends one embodiment or form of the invention.

By reference to the figures referred to, it

will be observed that when the door is swung open, the governor lever 15, by reason of the manner of constructing and mounting the same, especially by reason of the counterweight equipment, will rock on its lost motion pivot, toward the door in a manner for causing the crank rod 24 to rock in like direction and thereby to have no effect whatever upon the brake operating lever 35 or brake shoe 46. After the door has been opened, however, and is swung to the closed position, either by action of the spring hinges, or by an individual slamming the same, the governor lever will rock in a direction away from the door, and in a manner for rocking the crank rod in a like direction, such as will cause the crank 38 thereof to engage the pendent arm 37 of the brake operating lever 35 to thereby rock the same and cause the upward angled extension 39 to engage the brake shoe 46 to force the same into tight frictional contact with the check rod 47 to thereby retard closing action of the door in degree according to the speed of movement of the said door. By reason of providing the counterweight feature upon the governor lever this retarding action in accordance with the speed of movement of the door, is made possible, it being understood that the greater the speed of movement of the closing door, the greater will be the tendency for the counterweight to throw the long end of the governor outward on its lost motion pivot to thereby apply the brake shoe with greater force.

Obviously by adjusting the weight or position of the counterweight by adding washers thereto, or by changing the position of the weight with relation to the pivot, the action of this governor lever may be varied to suit the requirements. By reason of the provision of the pivot bolt 10 and the connections therefor, it is possible to vary the relative position of this bolt and the elongated aperture 16 of the governor lever so as to permit more or less free motion of the lever in a certain direction allowing the lever to attain more or less momentum during its action in accordance with the relative position of the parts mentioned, it being obvious that the more lost motion provided in a given direction, the greater will be the momentum attained in that direction before the lever actually comes into action.

In the form of the invention illustrated in Figures 8 to 14 inclusive, the governor lever, the supporting bracket therefor and the pivotal connections are the same as in the preceding form and in this form the said governor lever is link-connected as at 50 to the crank portion 51 of the brake actuating rod 52 which, however, in the present form of the invention, is vertically oscillatable in the bearing members 53 which are secured as at 54 to the door and which are provided with noiseless bearing lining sleeves 55 such as have hereinbefore been described. The upper end of the actuating rod 52 is provided with a crank portion 56 which is adapted to work in the slot 57 provided in the end of the longitudinally movable brake bar 58.

A fixed bar 59 and a movable bar 60, both shaped from flat metal to be semi-circular in cross section are cooperative with the said longitudinally movable braking bar 58, the said bar being slidably mounted between the same. The bar 59 is secured at each end, as at 61, to carrying brackets 62 secured as at 63 to the door and which may be shaped up from single sheets of metal to provide the securing portions stated and an angle bent portion 64 so formed to provide both guides and end abutments for the movable bar 60, before referred to. It will be observed by reference to Figures 11 and 12 of the drawing that the parts 58, 59 and 60 are circular in cross section, considered compositely.

A brake sleeve or shoe 65 is provided and mounted in a freely slidable manner surrounding the members 58, 59 and 60 when the said members are at their normal position. The brake shoe 65 is, of course, constructed of material similar to that of which the brake shoe 46, described in the first form of the invention, is constructed, and is fitted within to be carried by the shoe carrying sleeve 66 to which the sleeve securing rod 67 is pivotally connected as at 68, the said securing rod 67 being in turn pivotally secured to the door frame by the screw eye connection 69. By reason of clamping the sleeve by the pivot connection 68, and also by reason of the fact that the pivot forming eye of the securing rod 67 projects inwardly through the sleeve and into engagement with the brake shoe in the manner illustrated, the said brake shoe is effectively held against displacement in a manner, however, which makes possible its ready replacement.

The longitudinally slidable braking bar 58 is provided with apertures 71 adapted to loosely receive ball bearings 72 which, when the said bar 58 is moved in the proper direction, are adapted to engage cam lugs 73 stamped in the aforesaid bar 59 in a manner for forcing the movable bar 60 outwardly into tight frictional or braking engagement with the brake shoe 65.

By reference to Figure 10, it will be observed that all of the bearing brackets hereinbefore described may either be secured directly to the door or upon a common carrier plate 74 which may be secured in turn upon the door as at 75, and in which latter instance the whole of the apparatus may be removed as a unit instead of piece-meal.

In this modified construction of the invention, the governor lever function is ex-

actly the same as in the first form described, it being understood that when the door is open, the counterweighted portion of the lever will move away from the door, and in a manner for rocking the brake actuating rod 42 in a direction which will not cause a movement of the slidable bar 58 such as will effect engagement of ball bearings 72 and cam lugs 73 and application of the brake devices. When, however, the door is swung to the closed position, the counterweighted portion of the lever will swing toward the door and cause a rocking of the actuating rod in a direction which will cause longitudinal movement of the said bar 58 in the direction toward the left in the said Figure 10 and such as will cause an engagement of the ball bearings and the cam lugs and thereby the forcing outwardly of the movable bar 60 into frictional engagement with the brake shoe 65, thus braking the sliding action thereof over the composite slide guide formed by the said members 58, 59, 60. Obviously, the governing lever structure being the same, the braking action will be so controlled thereby that the braking devices will be applied in degree in accordance with the speed of movement of the door in closing.

Difficulty is often occasioned in the provision of door checks upon doors which are equipped with spring latches, such as night latches. In many instances the checking action of the applied devices continues to the point of absolute closing of the door, thus braking the closing action of the door to the extent where all of the momentum of the closing action has ceased at the time of absolute closing, making it impossible for the door to absolutely close because of the slight obstruction formed by the spring elements. In other words, the speed of the closing door has been checked to the extent that the door will not close but will remain slightly ajar.

I have sought to overcome this objection and provide for a neutralizing of the braking action just prior to the point of absolute closing of the door so that just enough momentum of the door will be saved to permit its absolute closing against the action of whatever spring latches the same may be equipped with.

To accomplish this purpose, I provide a spring member 76 adapted to be secured to the door check in position for engaging the top edge of the door in closing and at a point adjacent the path of movement of the governor lever 15. This member includes cam portions 77 adapted to be engaged by the upper edge of the door in opening and closing to permit free passage of the door but for imparting a sufficient cushioning jar to the door to neutralize the position of the governor lever and thus remove brake action and permit the door to completely close easily.

This spring member 76 is, of course, mounted to extend a distance from the door jamb in accordance with the requirements controlled by whatever spring arrangements the door may be equipped with, it being possible to extend the said member a greater or lesser degree in accordance with the point at which the brake action should be neutralized to the best advantage. This feature of the invention is, of course, an unnecessary feature to perfect functioning of the invention for the common purpose for which devices of this type are provided and its use is optional.

From the foregoing description, taken in connection with the accompanying drawings, it is thought that the novel details of construction, the manner of operation and the advantages of the invention will be readily apparent to those skilled in the art to which it relates.

What I claim is:—

1. In a device of the class described, a check rod connected to the door frame, a slide-guide for the check rod carried by the door, a brake device carried by the slide-guide and associated with the check rod, and means for bringing the brake device into engagement with the check rod to check the slidable motion thereof according to the speed of movement of the door.

2. In a device of the class described, a check rod connected to the door frame a slide guide for slidably and pivotally connecting the check rod with relation to the door, and a brake device on the door associated with the check rod and adapted to be brought into engagement therewith to check the slidable motion of the check rod according to the speed of movement of the door.

3. In a device of the class described, a check rod connected to the door frame and slidably and pivotally connected with relation to the door, a brake device on the door associated with the check rod to check the slidable motion of the check rod, and a vertically pivoted pendulum governor lever and connections for effecting application of the brake device to the check rod in accordance with the speed of movement of the door.

4. In a device of the class described, a check rod connected to the door frame and slidably and pivotally connected with relation to the door, a brake device on the door associated with the check rod to check the slidable motion of the check rod, and a vertically pivoted pendulum and weighted governor lever for automatically effecting application of the brake device to the check rod when the door is closing and the release thereof when the door is inert or being opened.

5. In a device of the class described, a check rod connected to the door frame and slidably and pivotally connected with rela-

tion to the door, a brake device on the door associated with the check rod to check the slidable motion of the check rod, a pivoted and weighted governor lever for automatically effecting application of the brake device when the door is closing and the release thereof when the door is inert or being opened, and means for adjusting the weight and position of weight of the governor lever to increase or diminish the force of its function.

6. In a device of the class described, a check rod connected to the door frame and slidably and pivotally connected with relation to the door, a brake device on the door associated with the check rod to check the slidable motion of the check rod, a pivoted and weighted governor lever for automatically effecting application of the brake device when the door is closing and the release thereof when the door is inert or being opened, and an adjustable lost motion pivot for said governor lever.

7. In a device of the class described, a check rod connected to the door frame and slidably and pivotally connected with relation to the door, a brake device on the door associated with the check rod to check the slidable motion of the check rod, a pivoted and weighted governor lever for automatically effecting application of the brake device when the door is closing and the release thereof when the door is inert or being opened, an adjustable lost motion pivot for said governor lever, and means for adjusting the weight and position of weight of the governor lever to increase or diminish the force of its function.

8. In a device of the class described, a check rod connected to the door frame and slidably and pivotally connected with relation to the door, a brake device on the door associated with the check rod to check the slidable motion of the check rod, a pivoted governor lever and connections for effecting application of the brake device to the check rod in accordance with the speed of movement of the door, and means for effecting action of the governor lever to effect an automatic brake shoe release just prior to the absolute closed door position.

9. In a device of the class described, a check rod connected to the door frame and slidably and pivotally connected with relation to the door, a brake device on the door associated with the check rod to check the slidable motion of the check rod, a pivoted governor lever and connections for effecting application of the brake device in accordance with the speed of movement of the door, and a flat spring device secured to the door frame for engaging the door to cause the governor lever to effect an automatic brake shoe release just prior to the absolute closed door position.

10. In a device of the class described, a check rod connected to the door frame and slidably and pivotally connected with relation to the door, a brake device on the door associated with the check rod to check the slidable motion of the check rod, a pivoted and weighted governor lever for automatically effecting application of the brake device when the door is closing and the release thereof when the door is inert or being opened, an adjustable lost motion pivot for said governor lever, means for adjusting the weight and position of weight of the governor lever to increase or diminish the force of its function, and a flat spring device secured to the door frame for engaging the door to cause the governor lever to effect an automatic brake shoe release just prior to the absolute closed door position.

11. In a device of the class described, a check rod pivoted to a fixed support, a guide mechanism for the check rod and mounted upon a door, a brake shoe carried by the guide mechanism, and lever devices including a pendulum for applying the brake shoe to braking contact with the check rod.

12. In a device of the class described, a check rod pivoted to a fixed support, a guide mechanism mounted upon a door and through which the check rod passes, a brake shoe carried by the guide mechanism, levers for effecting application of the brake shoe to the check rod, and a pivoted governor lever for acting upon the brake applying levers to cause them to apply the brake shoe when the door is closing.

13. In a device of the class described, a check rod pivoted to a fixed support, a guide mechanism associated with the check rod and mounted upon a door, a brake shoe carried by the guide mechanism, levers for effecting application of the brake shoe to the check rod, and a vertically pivoted and weighted pendulum governor lever for acting upon the brake applying levers to cause them to apply the brake shoe when the door is closed and to automatically release the same when the door is inert or being opened.

14. In a device of the class described, a check rod pivoted to a fixed support, a guide mechanism associated with the check rod and mounted upon a door, a brake shoe carried by the guide mechanism, levers for effecting application of the brake shoe, a pivoted governor lever for acting upon the brake applying levers to cause them to apply the brake shoe when the door is closing, and means for engaging the door to cause the governor lever to effect an automatic brake shoe release just prior to the absolute closed door position.

15. In a device of the class described, a check rod pivoted to a fixed support, a guide mechanism associated with the check

rod and mounted upon a door, a brake shoe carried by the guide mechanism, levers for effecting application of the brake shoe, a pivoted governor lever for acting upon the brake applying levers to cause them to apply the brake shoe when the door is closing, a flat spring device secured to the door frame for engaging the door to cause the governor lever to effect an automatic brake shoe release just prior to the absolute closed position.

16. In a device of the class described, a check rod pivoted to a fixed support, a guide mechanism associated with the check rod and mounted upon a door, a brake shoe carried by the guide mechanism, levers for effecting application of the brake shoe, a pivoted and weighted governor lever for acting upon the brake applying levers to cause them to apply the brake shoe when the door is closed and to automatically release the same when the door is inert or being opened, and means for adjusting the weight and position of weight of the governor lever to increase or diminish the force of its function.

17. In a device of the class described, a check rod pivoted to a fixed support, a guide mechanism associated with the check rod and mounted upon a door, a brake shoe carried by the guide mechanism, levers for effecting application of the brake shoe, a pivoted and weighted governor lever for acting upon the brake applying levers to cause them to apply the brake shoe when the door is closed and to automatically release the same when the door is inert or being opened, and an adjustable lost motion pivot for the said governor lever.

18. In a device of the class described, a check rod pivoted to a fixed support, a guide mechanism associated with the check rod and mounted upon a door, a brake shoe carried by the guide mechanism, levers for effecting application of the brake shoe, a pivoted and weighted governor lever for acting upon the brake applying levers to cause them to apply the brake shoe when the door is closed and to automatically release the same when the door is inert or being opened, an adjustable lost motion pivot for the said governor lever, and means for adjusting the weight and position of weight of the governor lever to increase or diminish the force of its function.

19. In a device of the class described, a check rod pivoted to the door jamb, a turntable, bearings carried by the turn-table for slidably receiving the check rod, a brake shoe associated with the turn-table and positioned for engaging the check rod at times, levers for applying the brake shoe, a bracket for providing bearing for turn-table and levers, and means for governing the action of the levers to effect application of the brake shoe according to the speed of movement of the door.

20. In a device of the class described, a check rod pivoted to the door jamb, a turntable, bearings carried by the turn-table for slidably receiving the check rod, a brake shoe associated with the turn-table and positioned for engaging the check rod at times, levers for applying the brake shoe, a bracket shaped up from a single sheet of metal for providing bearing for turn-table and levers, and means for governing the action of the levers to effect application of the brake shoe according to the speed of movement of the door.

21. In a device of the class described, a check rod pivoted to the door jamb, a turntable, bearings carried by the turn-table for slidably receiving the check rod, a brake shoe associated with the turn-table and positioned for engaging the check rod at times, levers for applying the brake shoe, a bracket for providing bearing for turn-table and levers, a packer disk inserted between turntable and bearing bracket, and means for governing the action of the levers to effect application of the brake shoe according to the speed of movement of the door.

22. In a device of the class described, a check rod pivoted to the door jamb, a turntable, bearings carried by the turn-table for slidably receiving the check rod, a brake shoe associated with the turn-table and positioned for engaging the check rod at times, a bracket shaped up from a single sheet of metal for providing bearing for turn-table and levers, a packer disk inserted between turn-table and bearing bracket, and means for governing the action of the levers to effect application of the brake shoe according to the speed of movement of the door.

23. In a device of the class described, a check rod pivoted to the door jamb, a turntable, bearings carried by the turn-table for slidably receiving the check rod, a brake shoe associated with the turn-table and positioned for engaging the check rod at times, a bracket shaped up from a single sheet of metal for providing bearing for turn-table and levers, a packer disk inserted between turn-table and bearing bracket, and a pivoted and weighted governor lever for automatically acting upon the levers for effecting brake application in accordance with the speed of movement of the door, an adjustable lost motion pivot for the governor lever, and means for adjusting the weight and position of weight of the governor lever to increase or diminish its force of function.

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