

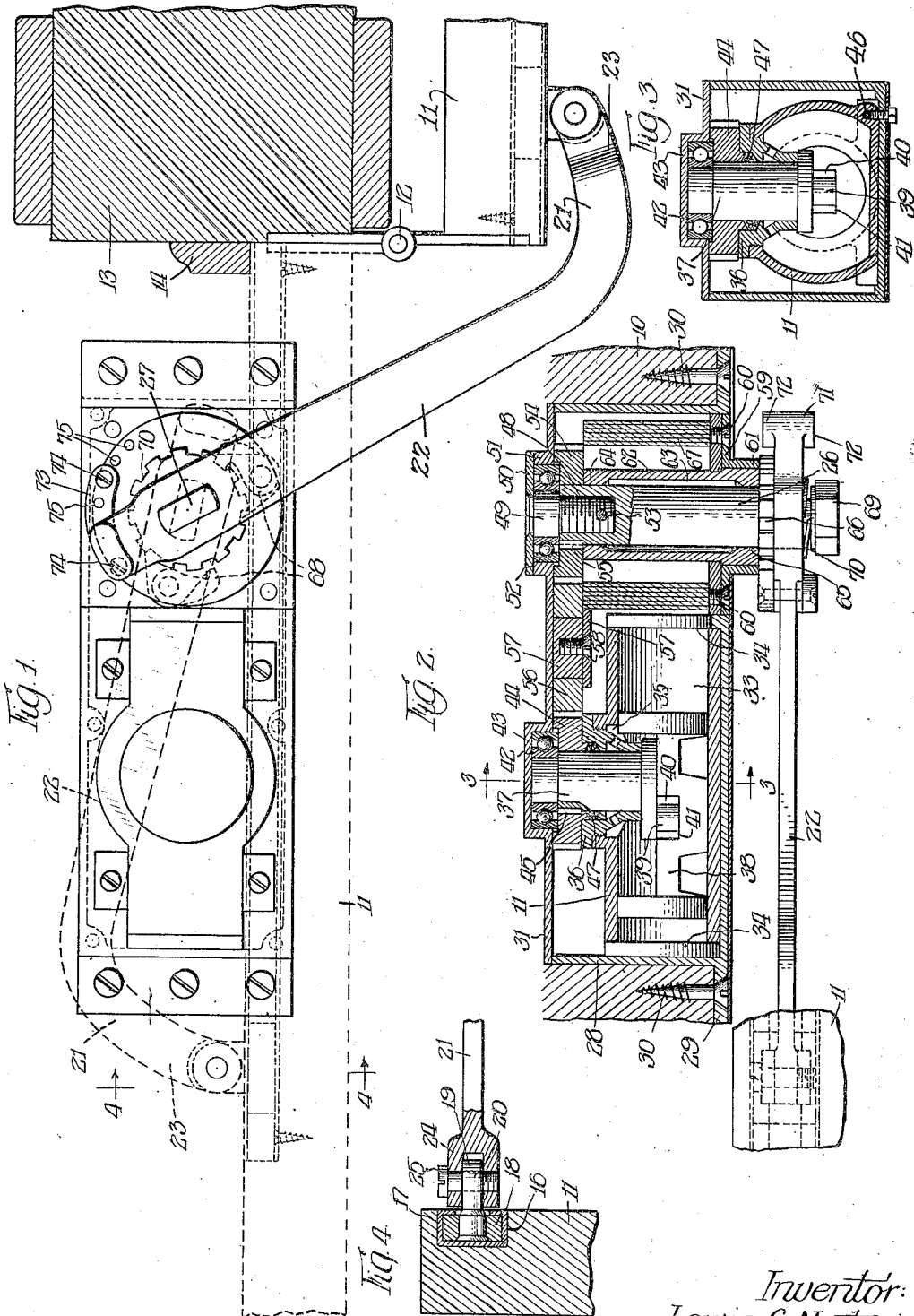
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DOOR CLOSING AND CHECKING DEVICE

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UNITED STATES PATENT OFFICE

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DOOR CLOSING AND CHECKING DEVICE

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This invention relates to door closing and checking devices and is herein illustrated as embodied in a door check of the concealed type, mounted in the door sill above the door.

5 This invention embodies features which render the door check applicable more particularly to doors opening in a single direction, or in other words, doors which close against a door jamb as distinguished from
10 double acting or swinging doors.

An object of the present invention is to provide a novel door closing and checking device which will act to close the door and control the closing movement in any open
15 position and bring the door quickly and quietly in a positive manner, to a position of rest against the door jamb.

Another object of this invention is to provide a novel door closing and checking device which is highly efficient in operation, is simple and compact in construction and one which readily adapts itself for installation above the door, it being understood however,
20 that the device covered in this invention may be installed in the floor and is not limited to overhead installations.

Another object of this invention is to provide a door check of the above described type and means therefor for readily connecting
25 the door check with the door whereby the door will be closed and the movement thereof will be properly controlled.

Another object of the present invention is to provide in a door check of the concealed
30 type, means which are readily accessible for adjusting the strength of the closing spring.

A further object is to provide in combination with a door check of the above described type, novel means for automatically holding
35 the door open against the action of the closing spring.

A further object is to provide in combination with a door check of the above described type, novel means for automatically holding
40 the door open against the action of the closing means in any predetermined open position and further, holding means which is capable of ready adjustment to vary the holding position.

50 Another object is to provide various novel

means for accomplishing the necessary closing and controlling operations, together with connecting mechanism therefor, all of such construction that an improved closing and
55 controlling action is produced, making for higher efficiency in operation and further to provide a door check which is extremely durable in service and has a high resistance to wear.

The present disclosure is given merely by
60 way of example and is not to be considered as limiting the invention in any particular but merely as one embodiment thereof and the scope of the invention will be determinable from an understanding of the present
65 disclosure, and with the recognition of the advantages which the invention produces in the present illustration.

Various other objects not specifically enumerated are contemplated in this invention and these will readily appear to one
70 skilled in the art as the description proceeds.

The following description will be more readily understood by referring to the accompanying drawing, in which:—
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Figure 1 is a view of a door closing and checking means, constructed in accordance
80 with the present invention and mounted in the sill above the door as seen when looking up, also disclosing the door and door sill.

Figure 2 is a longitudinal cross sectional view in elevation, of the door check shown in
85 Figure 1.

Figure 3 is a transverse cross sectional elevation taken on the line 3—3 of Figure 2
85 and looking in the direction of the arrows and

Figure 4, is a cross sectional elevational view of the slide connection, taken on the
90 line 4—4 of Figure 1 and looking in the direction of the arrows.

By referring to the drawing, it will be noted that the present invention is illustrated as embodied in a door check mounted in a door sill 10, above the door 11. The door
95 11 is of the single acting type and swings on the hinge 12 secured to the door sill 13. The door in its closed position, abuts the jamb 14. The hinge may be of any suitable construction as it forms no part of the present
100

invention. The door 11 is provided near its top, in one side face thereof, that is the side which abuts the door jamb, with an elongated horizontal opening 16, in which is mounted the guide track 17, for the slide connection as shown in Figure 4. The guide track is held by screws or any other suitable means.

Mounted in the slide track, is a slide block 18 having a boss 19 provided with the bearing opening 20. The arm 21, which is connected to the door checking device, in a manner hereinafter described, is preferably provided with a straight portion 22, and a curved end 23, terminating in a yoke 24, having openings therethrough for accommodating the bearing bolt 25 which establishes a pivot connection between the end of the arm and the slide block 18. It will be understood that the slide track is of sufficient length to accommodate the movement of the slide block in the extreme positions of the door.

The arm 21 is rigidly connected to the spindle 26 by means of the straight sided opening 27, fitting on the straight sided end of the spindle whereby when the arm is caused to move with the door, the arm imparts rotary movement to the spindle. The spindle 26 is pivotally mounted in the closing and retarding mechanism which in the present illustration, comprises a housing 28 having enlarged flanges 29 at the base thereof constituting means by which the device may be held in place by the screws 30 or similar means. The casing 28, may be of any suitable construction but is herein shown as comprising an integral base plate and side walls with a top plate 31, secured in a manner to close the top opening. The top plate is removable and permits an opening in the casing through which the device may be assembled.

Mounted in the case 28 is a fluid checking device designated generally 32, which comprises a cylinder 33, having closed ends 34 and an opening 35 in the top thereof, centrally located, which receives and supports the member 36. This member has screw threaded engagement with the casing 32 and extends inwardly thereof to constitute a bearing for the spindle 37. A double-headed piston 38, is slidably mounted in the cylinder and is connected with the spindle by any suitable means but in the present instance, by means of the crank 39 and the slide 40, the latter of which is mounted in a transverse groove 41 in the piston. The upper end of the spindle extends beyond the casing 32 and is constructed for bearing mounting in the anti-friction bearing 42. The anti-friction bearing is mounted in the pocket 43, provided in the upper plate 31. Mounted on the spindle 37 between the member 36 and the anti-friction bearing, is the gear 44, fixed to the spindle so as to form a driving connection therefor by means of the key 45.

At this point, it should be understood that the fluid checking device may be of any suitable construction and that it is preferably a complete mechanism, entirely self-contained mounted inside the outer casing 38. The checking device is provided with suitable adjustments and fluid escapement passages which are well known in the art and may be located in any suitable manner such as shown at 46, in Figure 3.

It is to be noted that a suitable packing gland 47 is provided to prevent leakage of the fluid out through the bearing and this is constructed in the present illustration with the packing material contained in the recess provided in the member 36 with a portion of the gear 44 projecting thereinto in a manner to confine and expand the packing material.

The spindle 26, has a threaded opening 48 in the upper end thereof which receives the bolt 49. The bolt 49 has a plate 50 secured to its end which constitutes a closing plate for the opening provided by the upstanding flanges 51. The plate 50, with the flanges 51, constitute a pocket similar to the pocket 43, for receiving the anti-friction bearings 52.

The anti-friction bearing supports the bolt 49 and in turn, forms a pivot support for the upper end of the spindle 26. The spindle is held against rotation relative to the bolt 49 by means of pin 53, extending therethrough. On the upper end of the spindle adjacent the location of the bearing, a gear 54, is provided, fixed to the spindle by means of the key 55. Gears 54 and 44 are connected by means of an idler gear 56 which has a bearing surface mounted on the lug or boss 57 projecting downwardly from the upper plate 31 of the casing. This boss may be either integral with the casing or otherwise rigidly secured thereto. The outer surface of the boss is constructed for bearing surface for the gear and the gear, after being mounted thereon, is held in place by means of the plate 57 and the screw 58 which screws into the boss.

The lower portion of case 28 at the location of the spindle 26, is provided with an opening which is closed by the plate 59 secured by means of screws 60. This plate is provided with a central opening having flanged walls 61, which form a bearing support for the sleeve 62. The sleeve 62 is provided with a central enlargement 63 in a manner to provide bearings 64 and 65 at its end portions on the spindle 26.

Integral with the sleeve at its lower portion and outside of the casing, is the flange 66 having a plurality of notches 70, around its periphery. This flange abuts and rests on the arm 21 whereby it is held against downward displacement. Positioned around the spindle and sleeve is a coil spring 67, preferably of flat metal which has one end secured to a lug, not shown in the casing and the other end secured to the shaft. The notched

flange 66 is adapted to cooperate with the dog 68, pivotally mounted on the arm so that the movement of the arm in one direction, that is, the direction the arm moves when the door is opening, will impart a winding movement to the spring. In addition, it will be appreciated that by releasing the dog, the spring may be wound for adjustment by turning the notched flange 66 and re-setting the dog in any desired notch. The arm is shown with a dog 68 on both faces thereof so that the same arm may be used in connection with a door of either hand, it only being necessary to invert the arm for installation.

The arm, in addition to being fixedly mounted on the end of the spindle 26, is held against downward displacement by means of the nut 69 and which is preferably mounted to provide a slight clearance which is normally taken up by the spring washer 70.

The arm 21 is extended on the opposite side of the pivot and terminates in an enlarged head 71 having upper and lower friction faces 72. This part of the arm, upon rotation of the arm, is brought into contact with the segment shaped friction plate 73 which is adjustably fixed to the under side of the casing by means of screws 74, entering certain of a series of screw holes 75. By selecting the proper holes, the friction plate 73 can be adjusted to the desired position so that the location at which a binding of the friction face 72 with the friction face 73 occurs, can be selected at will. It will be observed, that upon the door being opened to the pre-determined extent, that the friction face 72 will be brought into engagement with the friction plate, and that the first action will be for the arm to yield downwardly slightly, to take up the slack normally present on account of the spring washer 70, and that immediately thereafter, a binding will occur such that it will hold the door in open position.

By removing the screws 74 and re-setting the plate 75, the holding action can be automatically brought about at any position of the door. When it is desired to release the door, it is merely necessary to force it in the closing direction with sufficient force to break the frictional locking engagement.

The enlarged end of the arm is provided with a double head, that is two friction faces 72, so that the same action will be had when the arm is inverted.

In operation, it will be apparent that when the door is opened, that the arm will impart a rotary movement to the spindle 36 and also to the sleeve 62 so that the spring will be energized during this movement and the piston of the fluid checking device will be brought to a pre-determined position. The movement of the piston to this position offers no resistance as the valve mechanism is constructed to accomplish this action. However, upon the door being released, the energized

spring will act to move the arm in a manner to close the door and the movement of the spindle during this movement will be controlled through the instrumentality of the gears by the checking device to bring the door quietly and surely to its closed position against the door jamb.

By means of the single curved arm 21, and a sliding connection, the device is effective even when the door is opened to one hundred and eighty degrees as shown in Figure 1, and without the necessity of awkward and cumbersome link mechanism.

This device is neat and compact and highly efficient in operation. It will be observed that the parts can be readily adjusted, that is, the spring, the fluid checking device and the holding device, without removing the door check or any of the parts thereof.

Another great advantage is realized in placing the holding device at the location of the pivot carried by the door sill as when used in connection with the single arm and slide for instance, relative rotation between the friction parts is assured irrespective of the position of the door, therefore, the door can be accurately held at one hundred and eighty degrees of opening or any intermediate position, as desired.

I claim:

1. An overhead door check comprising a casing having a bearing in the top wall thereof, a fluid cylinder mounted in said casing having a bearing in its top spaced below said first named bearing, a spindle mounted in said bearings and connected for operation with a piston in said cylinder and having a gear fixed thereto between said bearings, said gear being connected for operation with the movement of a door by means of a spindle projecting below the lower wall of said casing.

2. An overhead door check comprising a casing having bearings in the top wall thereof, a fluid cylinder mounted in said casing having a bearing in the top spaced below one of said first named bearings, a piston in said cylinder and a spindle connected to said piston and mounted in said spaced bearings and having a gear fixed thereon between said bearings, a third bearing, in the bottom wall of said casing below the other of said first named bearings, and a spindle mounted on said bearings projecting below said casing for connection to a door, and a gear on said spindle for connection with said first named gear.

3. An overhead door check comprising a casing having bearings in the top wall thereof, a fluid cylinder mounted in said casing having a bearing in the top spaced below one of said first named bearings, a piston in said cylinder and a spindle connected to said piston and mounted in said spaced bearings and having a gear fixed thereon between

said bearings, a third bearing, in the bottom wall of said casing below the other of said first named bearings, and a spindle mounted on said bearings projecting below said casing for connection to a door, and a gear on said spindle for connection with said first named gear, and spring means in said casing connected to said last named spindle for resisting rotation thereof in one direction.

4. An overhead door check comprising a casing having bearings in the top wall thereof, a fluid cylinder mounted in said casing having a bearing in the top spaced below one of said first named bearings, a piston in said cylinder and a spindle connected to said piston and mounted in said spaced bearings and having a gear fixed thereon between said bearings, a third bearing, in the bottom wall of said casing below the other of said first named bearings, and a gear on said spindle for connection with said first named gear by means of an idler gear mounted on said casing.

5. An overhead door check comprising a casing having bearings in the top wall thereof, a fluid cylinder mounted in said casing having a bearing in the top spaced below one of said first named bearings, a piston in said cylinder and a spindle connected to said piston and mounted in said spaced bearings and having a gear fixed thereon between said bearings, a third bearing in the bottom wall of said casing below the other of said first named bearings, and a spindle mounted on said bearings projecting below said casing for connection to a door, and a gear on said spindle for connection with said first named gear by means of an idler gear mounted for rotation on the wall of said casing.

Signed at Chicago, Illinois, this fifth day of April, 1929.

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