

June 29, 1937.

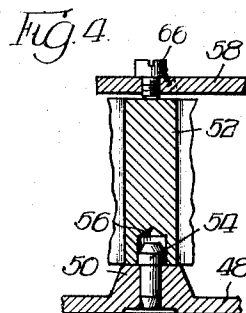
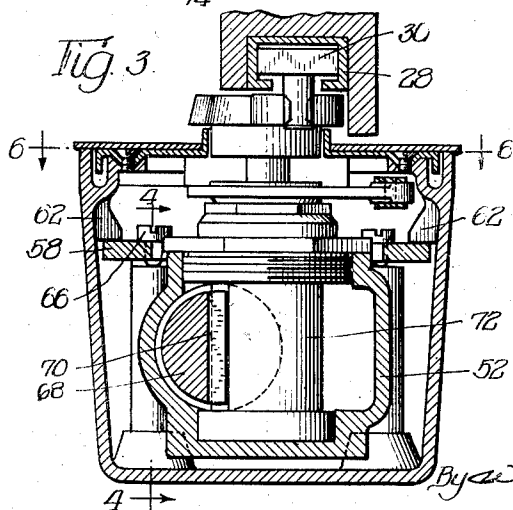
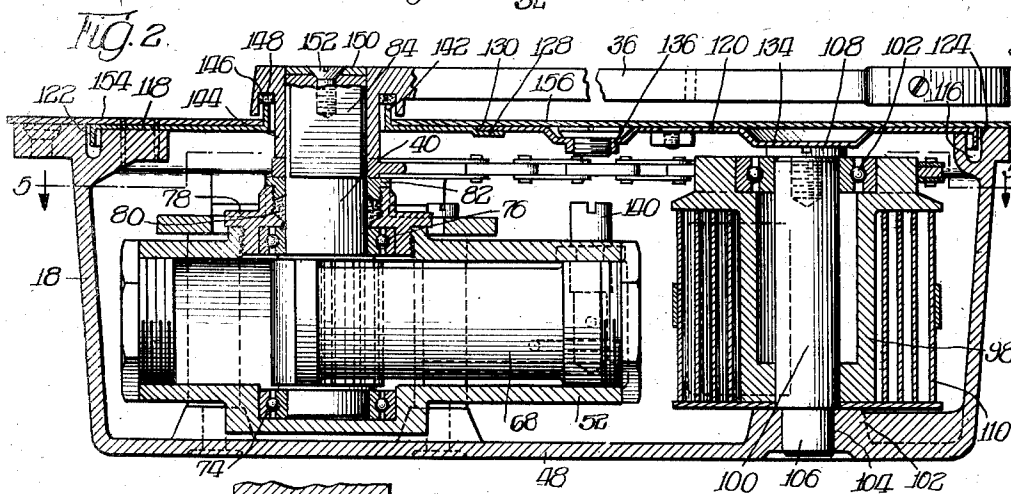
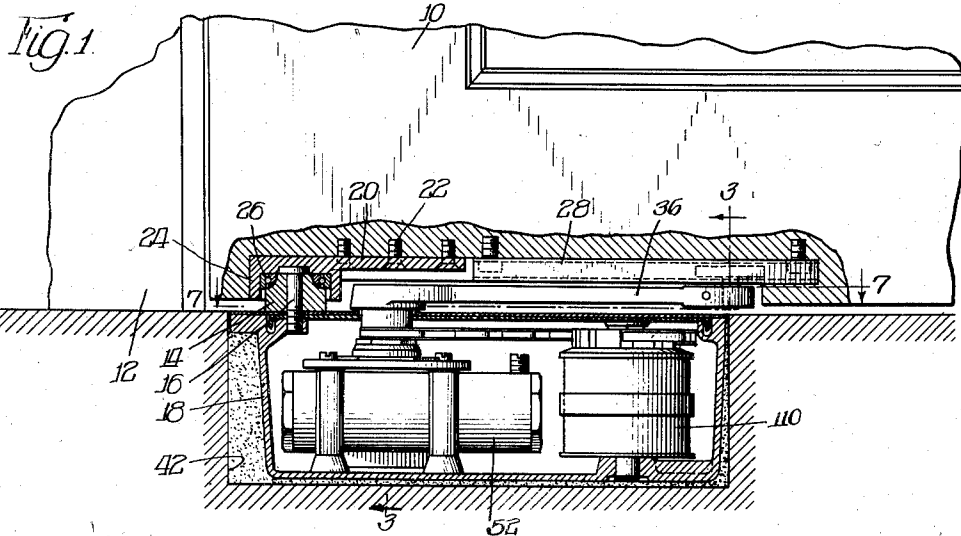
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2,085,593

DOOR CLOSING AND CHECKING DEVICE

Filed Feb. 19, 1934

2 Sheets-Sheet 1



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Fig. 5.

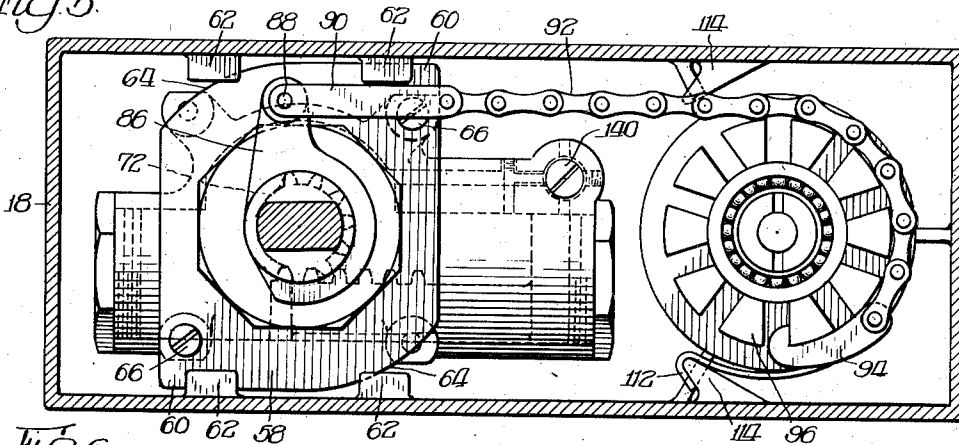


Fig. 6.

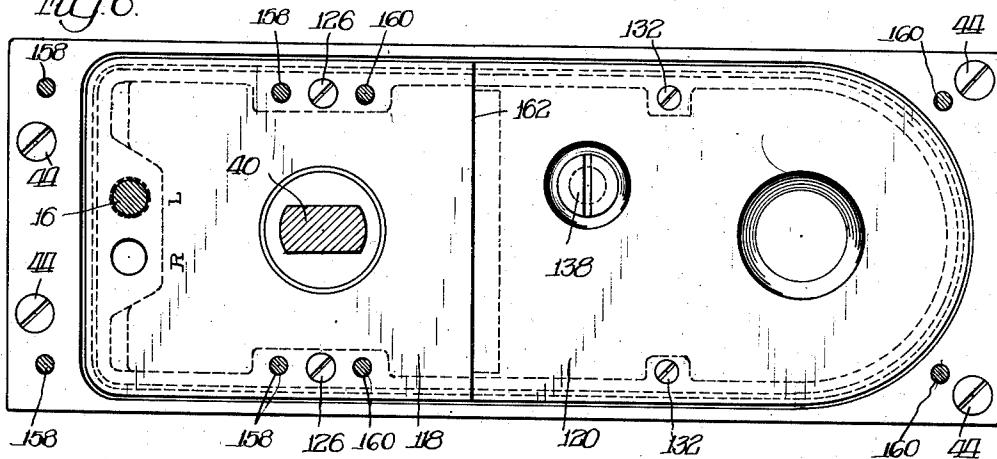
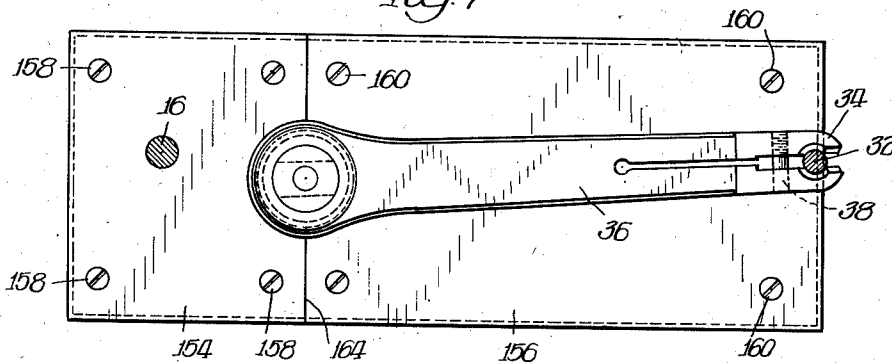


Fig. 7



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UNITED STATES PATENT OFFICE

2,085,593

DOOR CLOSING AND CHECKING DEVICE

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Application February 19, 1934, Serial No. 711,910

11 Claims. (Cl. 16—51)

This invention relates to improvements in door closing and checking mechanism, particularly of the single acting type adapted to be concealed in the floor beneath the door.

5 It is an object of my invention to provide a door closing and checking mechanism including a single casing which is intended for substantial permanent installation in the floor beneath the door and within which the fluid checking unit
10 and the spring unit, together with the other operating parts, may be removably installed.

It is further an object of my invention to provide novel means of locking the fluid checking unit within the main casing against displacement.

15 It is further an object of my invention to provide improved means for sealing the casing by inner and outer overlapping cover plates, the inner cover plates having flanges fitting in recesses in the upper edge of the casing and there being further provided sealing means between the
20 actuating shafts and the cover plates.

Additional objects and advantages of my improvements will be more readily apparent from the following description taken in connection with
25 the attached drawings, in which—

Figure 1 is an elevational view of the association of the door opening and closing mechanism with the door, portions of the structure being shown in section;

30 Figure 2 is a sectional elevation taken longitudinally through the door closing and checking device;

Figure 3 is a cross section on the plane indicated 3—3 in Figure 1;

35 Figure 4 is a detail section on the plane indicated 4—4 in Figure 3;

Figure 5 is a horizontal sectional view taken on the plane indicated 5—5 in Figure 2;

40 Figure 6 is a plan view of the door closing and checking device, the lever and top plates being removed, and,

Figure 7 is a plan view of the door closing and checking device.

45 The door 10 is pivotally supported with respect to the door frame 12 for swinging movement in one direction only from its closing position. The weight of the door is carried on a pivot bearing 14 which is fastened by screw 16 to the casing 18 of the door closing and checking device. The
50 lower edge of the door has secured thereto a pivot member 20 fastened by screws 22 and having a cup-shaped portion 24 which fits over the pivot bearing 14 and receives a ball bearing 26 through which the width of the door is supported
55 for free swinging movement. Also secured to

the lower edge of the door in line with the member 20 is a track 28 which is concealed within the door as shown in Figure 3. A slide 30 fits within the track 28 and has a downwardly extending pin 32 which is connected to the slotted
5 end 34 of lever arm 36, as shown in Figure 7. A clamping screw 38 is provided for clamping the lever arm to the pin 32. The lever arm is operatively connected at its opposite end to the actuating spindle 40 of the door closing and check-
10 ing mechanism.

The casing 18 is designed to fit into a recess 42 in the floor and is secured in position by screws 44. It is intended that the installation of the casing 18 in the floor should be substantially per-
15 manent since all the operating parts of the mechanism may be removed from the casing without removing the casing from the recess in the floor. The bottom wall 48 of the casing 18 is formed with bearing seats 50 for the support of the checking
20 cylinder 52. The casing 18 is designed to receive the checking cylinder in one of two positions for the operation of either a right or left hand swinging door. Dowel pins 54 are inserted in the bearing seats 50 and fit within recesses 56 formed in
25 the checking cylinder 52. After the cylinder 52 is placed in position, a clamping plate 58 is inserted and rotated to bring the square corners 60 beneath the lugs 62 formed on the casing 18. The other corners of the plate 58 are rounded as
30 at 64 to permit rotation and removal of the plate 58. The cylinder 52 is clamped in position by the provision of clamping screws 66 which are screwed through the plate 58 to bear against the
35 upper side of the checking cylinder 52, as shown in detail in Figure 4. The checking cylinder includes a piston 68 having a rack 70 operated by the mutilated pinion 72 on the spindle 40. The
40 spindle 40 is rotatably mounted in the checking cylinder by ball bearing 74 at the lower side of the checking cylinder and a ball bearing 76 at the upper side of the checking cylinder. A nut 78 is screwed into the cylinder 52 and receives the ball bearing 76. Packing 80 is provided to seal the
45 shaft 40, which packing is placed under compression by gland nut 82.

The upper end of the shaft 40 has flattened sides 84 in order to receive rotation from a lever 86 and to transmit rotation to the lever 36. The lever 86 has a pivotal connection 88 to a link 90,
50 which in turn is connected to a flexible chain 92. The chain 92 has a lug 94 at its end adapted to engage one of a plurality of ratchet lugs 96 on a ratchet member 98, which is rotatably supported on pin 100 through a ball bearing 102.
55

The pin 100 seats in a bearing seat 102 on the bottom wall 48 of the casing 18 which is provided with an opening 104 to receive the reduced lower end 106 of the pin 100.

5 The ratchet sleeve 98 is held against separation from the pin 100 by a cap screw 108 threaded into the upper end of the pin 100. A coiled spring unit 110 is provided which may be reversibly mounted in position to transmit rotation to the ratchet sleeve 98 in either direction. As shown the spring 110 has a bent portion 112 at its outer end engaging one of the stop lugs 114 formed on the side walls of the casing 18. The inner end of the spring 110 is locked to the ratchet sleeve 98 in the usual manner.

10 It will be apparent, therefore, that opening of the door will rotate the shaft 40, the lever 86 and through the flexible chain 92 will rotate the ratchet sleeve 98 in a direction to tension the spring.

The top portion of the door closing and checking mechanism is designed to provide a tight sealed closure of the casing. The casing 18 has a slotted recess 116 extending around its upper edge. A pair of plates 118 and 120 are provided which have flanged edges 122 and 124, respectively, fitting into the slotted recess 116. The plate 118 covers the checking cylinder end of the casing 18 and is secured in position by screws 126. At its right-hand end the plate 118 has an offset flange 128 which is overlapped by the left-hand edge 130 of plate 120. The plate 120 is fixed in position by the screws 132. The plate 120 has a depressed portion 134 which engages the cap screw 108 at the upper end of the pin 100 in order to hold the pin 100 against axial displacement. The plate 120 has another depressed portion 136 which has a threaded opening adapted to receive a threaded screw 138. By removing the screw 138 access may be had to the regulating screw 140 associated with the checking cylinder for the control of the fluid passages in the cylinder to determine the closing and latching speeds. The plate 118 has an upwardly flanged portion 142 surrounding the shouldered extension 144 of the lever 36 which engages the shaft 40. The lever 36 has a recess 146 which receives the annular flange 142 of the plate 118 and the packing 148 is received in this recess to provide a sealed joint between the movable lever 36 and the casing of the checking and closing device. The lever 36 is forced into tight sealing engagement by the provision of the washer 150 secured by screw 152 to the upper end of the shaft 40.

55 In order to completely cover and seal the door closing and checking mechanism and provide a smooth floor surface, an additional pair of plates 154 and 156 are provided. The plate 154 is secured by screws 158 at the checking end of the casing 18 and the plate 156 is secured by screws 160 to the other end of the casing 18. It will be noted that the separation line 162 between the inner plates 118 and 120 is spaced from the separation line 164 between the outer plates 154 and 156, which insures a dust and liquid proof seal.

I claim:

1. A door checking device adapted to be concealed in the floor beneath the door including a casing designed for substantially permanent installation in the floor, a fluid checking unit including a cylinder and an actuating shaft removably installed in said casing and a rotatable locking plate adapted to cooperatively engage said cylinder and said casing to hold said cylinder against separation from said casing.

2. A door checking device adapted to be concealed in the floor beneath the door including a casing designed for substantially permanent installation in the floor, a fluid checking unit including a cylinder and a vertical actuating shaft, centering means for positioning said unit in said casing, lugs on the side walls of said casing and a rotatable locking plate adapted to fit over said actuating shaft into engagement with the upper side of said unit and to extend beneath said lugs to hold said fluid checking unit against displacement from said casing.

3. A door checking device adapted to be concealed in the floor beneath the door including a casing designed for substantially permanent installation in the floor, a fluid checking unit including a cylinder and a rotatable actuating shaft extending into said cylinder in sealing engagement therewith, lugs integral with the side walls of said casing, cooperating positioning means between said fluid checking unit and the bottom wall of said casing, a locking plate adapted to be inserted in one position to engage the upper side of said fluid checking unit and to be rotated to extend beneath said lugs and threaded means in said locking plate for engaging said fluid checking unit to produce vertical displacement therebetween to rigidly secure said fluid checking unit within said casing.

4. A door closing and checking device adapted to be concealed in the floor beneath the door comprising a casing designed for substantially permanent installation in the floor, a fluid checking unit removably installed in the casing at one end thereof, a door closing spring assembly removably installed in the casing at the other end thereof, means connecting said fluid checking unit and said spring assembly within said casing, a pair of inner cover plates secured to said casing in overlapping engagement, a pair of outer cover plates secured to said casing and enclosing said inner cover plates, the line of separation between said outer cover plates being spaced from the line of separation of said inner cover plates, said fluid checking unit having an actuating shaft extending through said cover plates and sealing means between said cover plates and said actuating shaft.

5. A door closing and checking device adapted to be concealed in the floor beneath the door comprising a casing designed for substantially permanent installation in the floor, a fluid checking unit removably installed in the casing at one end thereof, a door closing spring assembly removably installed in the casing at the other end thereof, means connecting said fluid checking unit and said spring assembly within said casing, a pair of inner cover plates secured to said casing in overlapping engagement, a pair of outer cover plates secured to said casing and enclosing said inner cover plates, the line of separation between said outer cover plates being spaced from the line of separation of said inner cover plates, said fluid checking unit having an actuating shaft extending through said cover plates and sealing means between said cover plates and said actuating shaft, one of said inner cover plates having an opening and closure therefor through which access may be had to an adjustment for said fluid checking unit.

6. A door closing and checking device adapted to be concealed in the floor beneath the door comprising a casing for substantially permanent installation in the floor, a fluid checking unit removably installed in said casing including a

5 cylinder and a sealed actuating shaft extending
into said cylinder, a rotatable spring and hub
assembly removably mounted in said casing, flex-
ible means connecting the hub of said spring as-
10 sembly to the actuating shaft within said casing,
cover means for said casing in sealing engage-
ment with said casing and with said actuating
shaft, pivot means for said door mounted on
said casing and means exterior of said casing
15 for operatively connecting the actuating shaft
to the door.

7. A door checking device comprising a casing
adapted to be installed in a concealed position
within the floor beneath the door, fluid check-
15 ing means in said casing, a spindle extending
into said casing and operatively connected to
said fluid checking means, cover means for said
casing through which said spindle projects, door
pivot means for supporting the entire weight
20 of said door mounted on the upper side of said
cover means and spaced from said spindle, a
lug on said casing, means extending through
said cover means for fastening said pivot means
to said lug, and a door operated lever attached
25 to the projecting end of said spindle.

8. A door checking device comprising a casing
adapted to be installed in a concealed position
within the floor beneath the door, a checking
cylinder removably positioned in said casing,
30 lugs on the side walls of said casing, a locking
plate adapted to extend over said cylinder and
to fit beneath said lugs, adjustable means carried
by said locking plate engaging said cylinder for
producing relative vertical displacement between
35 said locking plate and said cylinder to hold said
cylinder and locking plate in fixed relation with
respect to said casing.

9. A door checking device comprising a casing
designed for substantially permanent installation
40 in the floor beneath the door, a fluid checking
cylinder removably installed in said casing, a
door operated spindle extending into said cylin-

der, a locking plate adapted to be positioned
above said cylinder and having an opening to
receive said spindle, means in cooperative en-
gagement between said casing and said locking
plate to hold said locking plate against upward
5 movement with respect to said casing and ad-
justable thrust means extending through said
locking plate into engagement with the upper
side of said cylinder to force said cylinder into
seating engagement upon said bottom wall of 10
said casing.

10. A fluid checking device adapted to be con-
cealed in the floor beneath the door including a
casing designed for substantially permanent in-
15 stallation in the floor, a fluid checking cylinder
removably installed in said casing and seating
upon the bottom wall thereof, a door operated
spindle extending into said cylinder, lugs integral
with the side walls of said casing, a locking plate
having an opening to receive said spindle where-
20 by said locking plate may be positioned above
said cylinder, and rotated to bring corner por-
tions thereof beneath said lugs and screws
threaded into and projecting through said lock-
ing plate into engagement with the upper side 25
of said cylinder whereby said locking plate is
forced into engagement with said lugs and said
cylinder is forced into tightly seated relation-
ship with the bottom wall of said casing.

11. A door checking device comprising a casing 30
adapted to be installed in a concealed position
in the floor beneath the door, fluid checking
means in said casing, a door operated spindle
extending into said casing and operatively con-
nected to said fluid checking means, and means 35
on said casing for detachably mounting a door
pivot in either one of two selected positions re-
lative to said casing and to said door operated
spindle, and a door pivot mounted on said means
and adapted to underlie and support the weight 40
of said door.

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