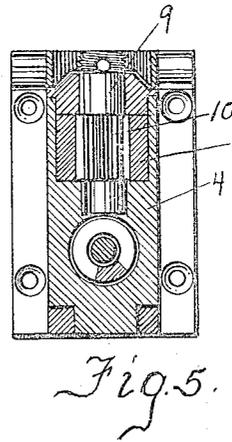
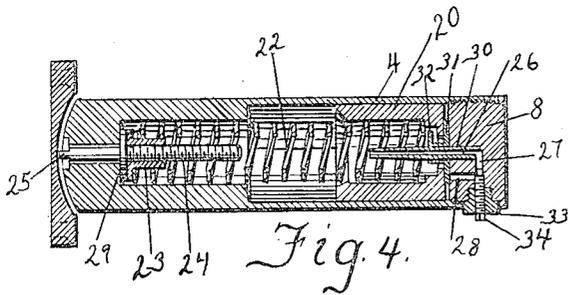
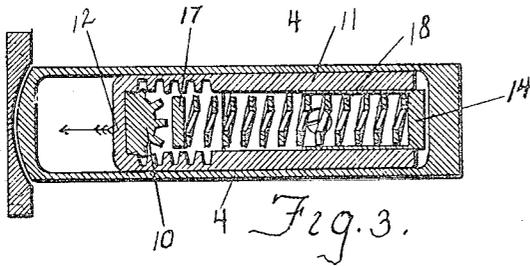
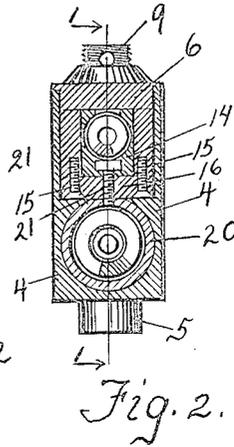
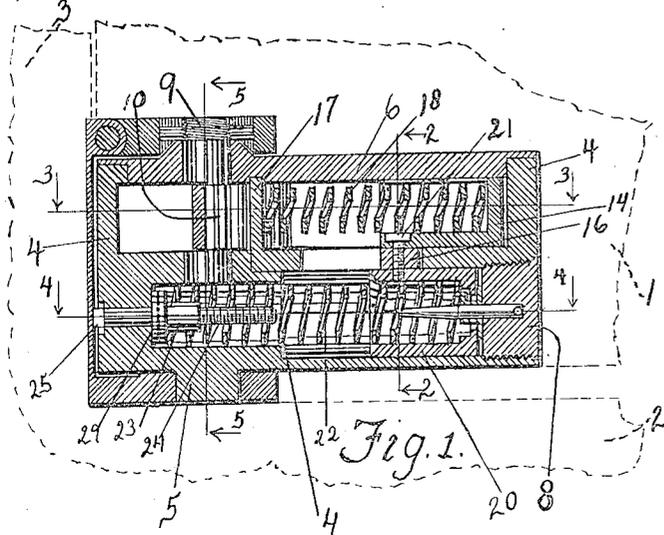


B. W. GAIR.
 DOOR CONTROLLING MECHANISM.
 APPLICATION FILED JUNE 4, 1914.

Patented Feb. 6, 1917.
 2 SHEETS—SHEET 1.

1,214,535.



WITNESSES:

Charles J. Cobb
 L. M. Baldwin.

INVENTOR.

BY *B. W. Gair*
Steele & Steele
 ATTORNEYS.

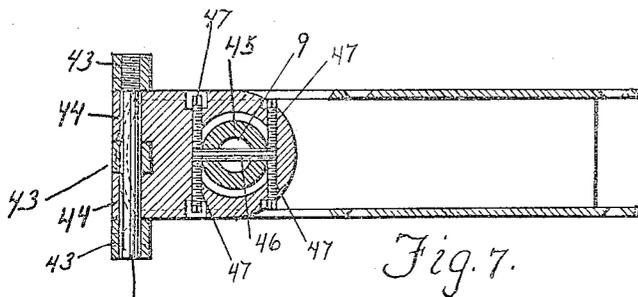


Fig. 7.

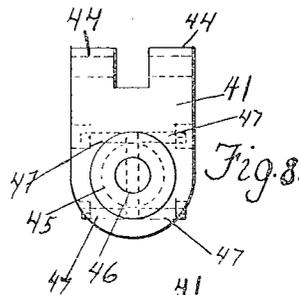


Fig. 8.

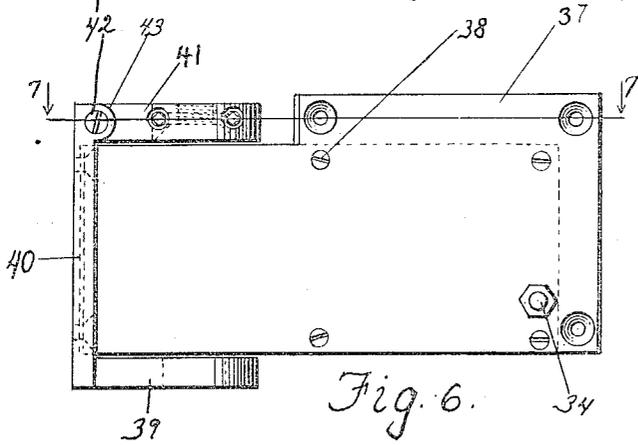


Fig. 6.

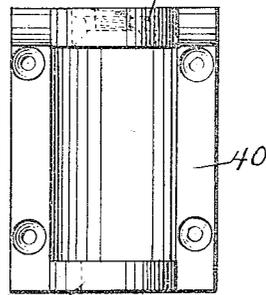


Fig. 9.

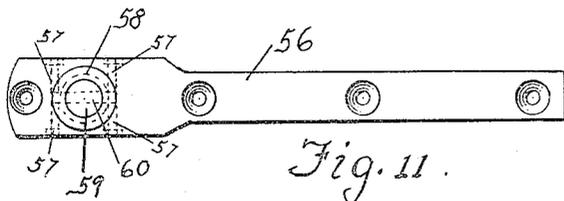


Fig. 11.

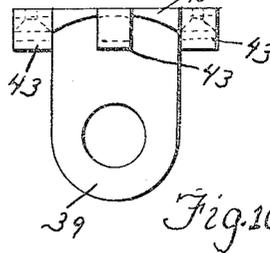


Fig. 10.

WITNESSES:

Charles J. Cobb
 L. H. Baldwin

INVENTOR.

Blair W. Gair
 BY *Steele & Co.*
 ATTORNEYS.

UNITED STATES PATENT OFFICE.

BLAIR W. GAIR, OF CHICAGO, ILLINOIS.

DOOR-CONTROLLING MECHANISM.

1,214,535.

Specification of Letters Patent.

Patented Feb. 6, 1917.

Application filed June 4, 1914. Serial No. 842,860.

To all whom it may concern:

Be it known that I, BLAIR W. GAIR, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Door-Controlling Mechanism, of which the following is a description.

The invention belongs to that general class of devices for controlling or closing of doors, and relates particularly to a controlling mechanism which is adapted to be carried by the door and operatively connected with the floor or structure, but which mechanism may be mounted in the floor if desired, and operatively connected to the door.

The invention has among its objects the production of a checking device which will positively close the door and normally maintain it closed, which device may be suitably adjusted or regulated to conform to the different requirements that are met with in different installations.

The invention also has among its objects the production of a compact mechanism which may be carried by the door or inserted in the floor, and which is suitable to double or single acting doors.

It has among its further objects the production of a device of the kind described that is simple, convenient, durable, compact, efficient, adjustable and satisfactory, that may be manufactured at comparatively small cost, and which will not easily get out of order.

To this end my invention consists in the novel construction, arrangement and combination of parts herein shown and described, and more particularly pointed out in the claims.

In the drawings, wherein like reference characters indicate like or corresponding parts, Figure 1 is a sectional view through the controlling mechanism, taken substantially on line 1, 1 of Fig. 2. Fig. 2 is a sectional view taken substantially on line 2, 2 of Fig. 1; Fig. 3 is a sectional view taken substantially on line 3, 3 of Fig. 1; Fig. 4 is a sectional view taken substantially on line 4, 4 of Fig. 1; Fig. 5 is a sectional view taken substantially on line 5, 5 of Fig. 1; Fig. 6 is a side elevation of the mechanism, including the parts for securing the device to the door and operatively connecting the same with the building or structure; Fig. 7 is a sectional view taken substantially through line 7, 7 of Fig. 6; Fig.

8 is a top plan view of the member 41; Fig. 9 is a front elevation of the member 40; Fig. 10 is a top elevation of the same; and Fig. 11 is a sectional view of a plate adapted to be secured to the door and cooperate with the controlling mechanism when said mechanism is installed in the floor.

Referring to the drawings, in which my preferred form of device is shown, I have indicated the door, frame and floor in dotted lines in Fig. 1, 1 being a door, 2 the floor and 3 the door frame. In this case the door mechanism is installed and carried by the door 1, suitable means being provided for operatively connecting the controlling mechanism with the fixed part of the structure. As shown, I have provided a suitable casing 4, having a lug 5 projecting from the lower end arranged for engagement with a bracket, for pivotally connecting the door and carrying it from the door frame or floor. The casing is provided with a removable top 6, and with a removable plug 8 at one end, the casing being oil containing. Projecting from the casing at the top or cover is a shaft 9, which carries or is provided with a gear segment 10, having suitable teeth thereon. The teeth 10 are arranged to mesh with suitably formed teeth on sliding yoke 11, the yoke being closed at the end as at 12, which part is arranged to cooperate with the post or shaft 9, as will be hereafter more fully set forth. Secured to the yoke member 11 is a member 14 and member 16, and plunger 20, the part 16 being secured to the sides 11 by screws 15, or their equivalents for the purpose.

As most clearly shown in Figs. 1 and 2, a stationary abutment or member 17 is arranged in the casing, and between the member or part 14 and the abutment 17 is arranged a spring 18, the spring tending to normally maintain the parts in the position shown in Figs. 1 and 3. Arranged below the yoke member in the chamber formed in the casing, is a plunger 20, the same being operatively secured to the yoke members 14 and 16 by screws 21, or their equivalents for the purpose. Means is also provided for normally maintaining the plunger or piston 20 in the position shown, it being understood that the spring 18 in the door chamber also tends to maintain the parts in the position shown. I have shown a spring 22, which bears against the end of the plunger 20 at

one end, and at the opposite end bears against an adjustable member so that the tension of the spring may be varied so as to control the operation or permit regulation of the mechanism. A nut member 23 is arranged on a threaded bolt 24, which extends to the exterior of the device, as at 25. A collar or flange 29 on the bolt acts as a stop for the bolt and prevents its being moved to the exterior of the casing. When, however, the bolt end and part is rotated, the nut 23 is moved upon the bolt, thereby increasing or decreasing the tension of the spring, depending upon which direction the bolt is rotated.

In the detachable plug 8 is arranged ducts or ports 27 and 28, and carried by the plug and extending through the end of the plunger, is a pipe 30, having an opening or duct 26 therein. It will be noted by referring particularly to Figs. 1 and 4, there is some space at the end of the plunger about the pipe 30. Slidably mounted on a pipe is a valve member 31, which extends through the opening in the plunger, and is provided with flanges 32, which tend to normally prevent the valve from disarrangement, the valve acting like any check valve. The passage of fluid through the ducts 26, 27 and 28 is normally controlled by a needle valve 34, suitably mounted in a stuffing box member 33.

When the device is applied to a door, I preferably secure the same in place on the door by plates 37 (see Fig. 6) which are preferably secured to the casing 4 by screws 38, on their equivalents for the purpose. It will be noted by referring to this figure that the valve member 34 projects through the face of the plate 37. The door is carried by a plate 39 having a hole for the reception of the pin or lug 5 on the casing 4. In the figures I have shown, the plate 39 extended as at 40 and suitably secured to the door frame. Preferably adjustably secured to the extension 40 is a member 41. Referring particularly to Figs. 7, 8 and 9, member 41 is provided with lugs 44 adapted to extend in between the lugs 43 on the member 40, the parts being secured together by a pin 42. The member 41 carries a member 45 adapted to be secured on the shaft 9, the same being prevented from rotating about the shaft by a pin 46, or its equivalent. The member 45 is preferably adjustably mounted in the member 41, and is maintained in the desired relation relative thereto by bolts 47 extending therethrough and arranged to cooperate with the pin 46. As is obvious, by this construction the door may be adjusted relative the shaft 9, so that it may be centered, or may be adjusted for various conditions, as for example against excessive wind pressure against one side of the door. If two of the bolts 47 be removed, for example the rear one on one side and the forward one

on the other it will allow the member 45 to be turned when the door is opened in one direction, with the retarding and returning mechanism remaining idle. The remaining bolts 47 will engage and bring the mechanism into action when the door is opened the other way, so that with an extra hinge so assembled and placed on a door (not considered necessary to illustrate) more power may be obtained on one side than the other, thereby making the same applicable for different conditions. The upper end of the door may, of course, be suitably secured in position in any desired way. In view of the fact, however, that any suitable mechanism may be employed for the purpose I have not considered it necessary to illustrate herein nor describe in detail any particular mechanism.

When the device is installed in the floor, the plates 37 may be omitted, as may also be the members 39, 40 and 41. In place of these members I employ a plate member 56, adapted to be secured to the bottom of the door. This member carries mechanism similar to that carried by member 41. Referring to Fig. 11, member 58 is mounted on the end of the spindle or shaft 59 (similar to shaft or spindle 9) the same being secured in place by a pin 60. Screw or bolt members 57 maintain the parts in the desired relation similar to the bolts 47.

The operation of the device may be briefly described as follows, assuming that the parts are as shown in the drawings, so that the door is in closed position: As the door is swung to one side, the shaft or spindle 9 being locked against movement by the members 40 and 41 and allied parts, the teeth of the gear segment 10 move the yoke 11 in the direction indicated by the arrow in Fig. 3. This causes the springs 18 and 22 to be compressed, and at the same time fluid in the plunger chamber flows through the opening in the end of the plunger and past the check valve to the other side of the plunger. Some fluid, of course, may flow through the pipe 30 and ducts to the other side of the plunger. When the door is released the springs tend to normally return the same to the position shown. However, the check valve 31 closes so that the fluid between the plunger and plug 8 must flow through duct 28, 27 and the duct 26 in the pipe 30, to the other side of the plunger. The valve 34 may be regulated so as to control the flow, thereby giving any desired degree of checking. It will be particularly noted that the first movement of the yoke is caused by one of the corners at the flat face of the gear segment. The result of this is that a little more force is required for starting the door than in continuing this movement, so that that same is not easily swung back and forth by a differ-

ence in pressure at the two sides of the door. Likewise, the flat part, when the parts are returned to position, springs the door back to the desired centering point. The operations are substantially the same where the device is installed in the floor, and the plate 56 shown in Fig. 11 used on the door, except, however, in this case the casing remains stationary while the shaft or spindle provided with the gear teeth is rotated, the effect being the same. It will be seen that the device is applicable for installation on the door or in the floor, or for single or double acting doors. It will also be seen that with the construction shown practically all of the required adjustments are possible. The device may be applied at any point on the door, and where desired more than one may be used, as for example where the door is very heavy, or where there is excessive wind pressure or the like on one side of the door. It will be particularly noted that with the device described not only is the door closed, but it is likewise checked, the door being brought to its normal position, or raised and maintained in that position by the flat face bearing against the end of the yoke member. The device is likewise applicable for single or double doors, and in fact for practically every kind of door, and for all conditions. It might be mentioned that with the device constructed as shown there is no chance for the fluid or oil contained within the casing to leak from the casing, since the spindle or shaft extends through the top of the casing instead of below.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of my invention; hence I do not wish to be understood as limiting myself to the exact form, construction, arrangement or combination of parts herein shown and described, or uses mentioned.

What I claim as new and desire to secure by Letters Patent is:—

1. In a device of the kind described and in combination, a casing, and means for securing the same to a door, means for pivotally supporting said casing and door, and said casing provided with an oil containing chamber therein, a plunger arranged in said chamber, a communicating chamber arranged proximate to said plunger chamber, means arranged in said plunger chamber for normally maintaining said plunger in operative position, a yoke member arranged in the adjacent chamber and operatively connected with said plunger, auxiliary means for resiliently maintaining said yoke and plunger in operative positions, a shaft arranged in said adjacent chamber and provided with means for en-

gaging said yoke, said shaft projecting to the exterior of the casing, and means for operatively connecting said shaft to the fixed part of the structure.

2. In a door checking device of the kind described and in combination, a floor plate, a fluid containing casing pivotally carried by said plate and provided with means for securing the same to a door, a shaft arranged in said casing and projecting therefrom at the top side thereof, means carried by said floor plate for engaging said shaft end and preventing the rotation thereof, said casing provided with two communicating chambers arranged one above the other, yieldable means arranged in said chambers and cooperating with said shaft for opposing the movement of the door and casing about its pivotal support and returning the same to a closed position, said means comprising a fluid-controlled plunger arranged in one chamber, resilient means for opposing the movement of said plunger and returning the same to normal position, means controllable from the exterior of the casing for adjusting the resilient means, a shaft engaging member arranged in the other chamber, said member connected with said plunger, and auxiliary resilient means for normally returning the said engaging member to normal position.

3. In a device of the kind described and in combination, an oil containing casing provided with means for securing the same to a door, a floor plate arranged to pivotally support said casing and door, said casing provided with a plurality of oil containing chambers therein, an oil controlled plunger arranged in one of said chambers, a spring arranged within said chamber, and arranged to cooperate with said plunger to oppose the movement thereof or return the same to normal operative position, a yoke member arranged in the adjacent chamber and operatively connected with said plunger, a spring member arranged to engage said yoke member, said casing provided with means for cooperating with said spring member and engaging one end thereof, a shaft arranged in said casing and provided with teeth arranged to engage said yoke, said shaft projecting from the casing on the top side thereof, and means for securing said shaft against rotation, comprising a bracket connected with said floor plate, and provided with means for engaging the upper end of said shaft.

4. The combination in a door closing and checking device of the kind described, of a casing provided with fluid containing chambers therein, means for securing said casing to a door, a fluid controlled plunger arranged in said casing, means for maintaining said plunger in operative position, a shaft projecting from the interior of the

casing to the exterior thereof at the top side, said shaft having gear teeth thereon, a yoke member arranged in said casing and extending on each side of the said shaft, and provided with teeth arranged to engage the teeth on said shaft, means for operatively connecting said plunger and yoke, supplemental means arranged in the yoke chamber, and tending to maintain the yoke and plunger in normal positions, and means carried by a fixed part of the structure for engaging and locking the said shaft against rotation.

5. In a door closing and checking device of the kind described and in combination, a casing provided with oil containing chambers therein, an oil controlled plunger arranged in one of said chambers, a spring arranged to oppose the movement of said plunger in said casing, a shaft arranged in said casing projecting from the top thereof, means arranged in the other of said chambers for engaging said shaft and operatively connecting said plunger therewith, a supplemental spring member engaging said connecting means and a portion of said casing, and means positioned above the casing and secured to a fixed part of the structure for engaging said shaft at the upper end thereof and preventing movement of the shaft upon movement of the casing thereabout, whereby

when said casing is moved said plunger will be retracted.

6. In a door closing and checking device of the kind described, and in combination, a part arranged to be attached to the door, and a part arranged to be attached to a fixed part of the structure, one of said parts comprising a casing provided with oil containing chambers therein, an oil controlled plunger arranged in one of said chambers, a spring arranged to oppose the movement of said plunger in said chamber, a shaft arranged in said casing with its upper end projecting from the top thereof to the exterior of the casing, means arranged in the other of said chambers for engaging said shaft and operatively connecting said plunger therewith, a supplemental spring member arranged to cooperate with said connecting means and supplement said plunger spring, and means for connecting the exposed end of said shaft with the other part.

In testimony whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

BLAIR W. GAIR.

Witnesses:

ROY W. HILL,
CHARLES I. COBB.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."