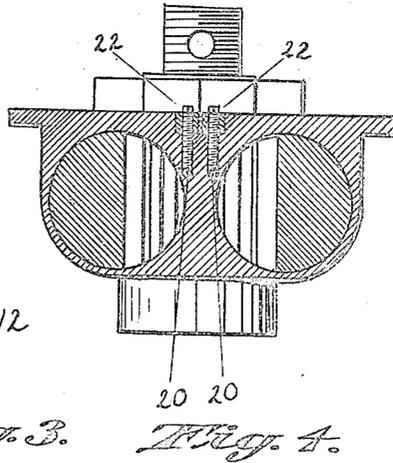
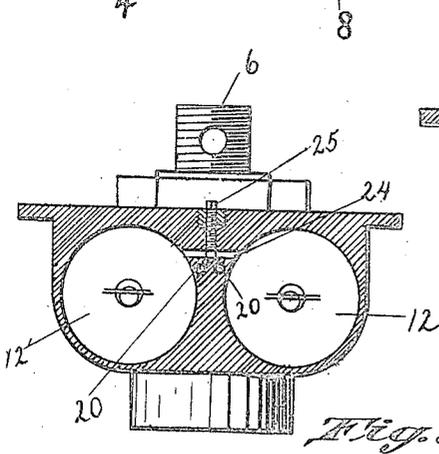
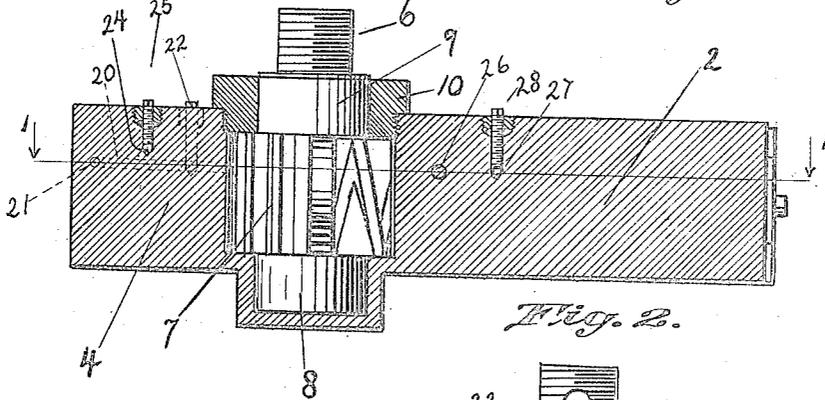
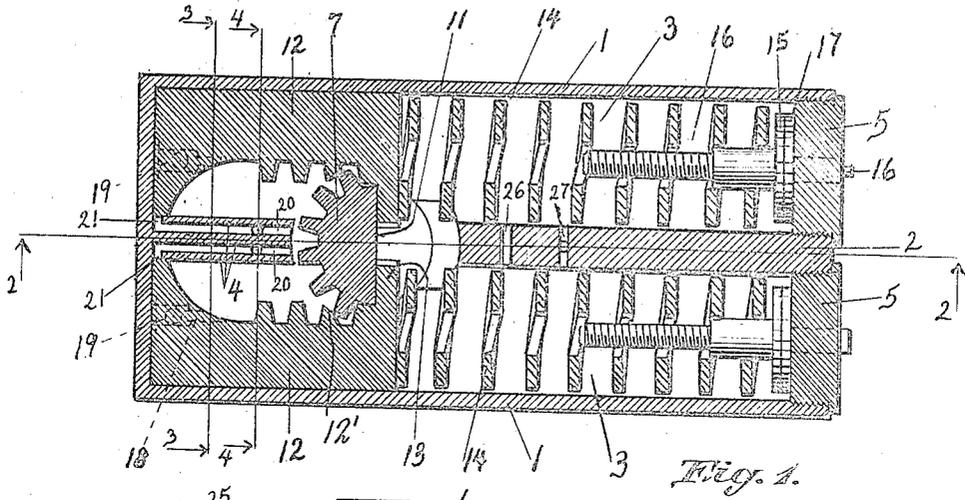


B. W. GAIR.
 DOOR CLOSING AND CHECKING MECHANISM.
 APPLICATION FILED JUNE 4, 1914.

1,253,369.

Patented Jan. 15, 1918.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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DOOR CLOSING AND CHECKING MECHANISM.

1,253,369.

Specification of Letters Patent.

Patented Jan. 15, 1918.

Application filed June 4, 1914. Serial No. 842,861.

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 Closing and Checking Mechanism, of which the following is a description.

My invention belongs to that general class of devices for controlling doors, and relates particularly to a mechanism of but few parts arranged to be preferably positioned in the floor and operatively connected with a single or double acting swing door. The invention has among its objects the production of a device of the kind described that is extremely simple and compact, and constructed to be adjusted and regulated so as to make the same applicable for practically any installation regardless of the conditions. The invention has among its further objects the production of a durable, efficient and satisfactory door mechanism for use wherever found applicable.

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 of my improved device 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, and

Fig. 4 is a sectional view taken substantially on line 4, 4 of Fig. 1.

Referring to the drawings, in which the preferred form of my device is shown, 1 represents a suitable casing, which is preferably suitably secured to or in the floor of a structure. The casing is provided with chambers 3, 3, divided by a cross partition 2 and 4, the chambers being normally closed by removable plugs or ends 5, 5. It may be mentioned that the casing and plugs are preferably so constructed that the device may contain any suitable fluid, as for example, oil, without danger of the same leaking out. Projecting from the casing 1 is a shaft 6, which is adapted to be suitably secured to a door, as will be hereafter de-

scribed. Shaft 6 is provided with a gear segment 7, having teeth formed thereon, the same being arranged as at 8 and 9 to be rotatably carried by the casing, and by a bearing member 10, as most clearly shown in Fig. 2.

Arranged in each chamber 3 of the casing is a plunger 12, the plunger being preferably cut away as most clearly shown in Fig. 1, provided with teeth arranged to mesh with the teeth on the gear segment 7.

It will be noted by referring to Fig. 1 that one tooth to each plunger is partially cut away as at 12' so as to clear the tooth of the gear segment adjacent to it, when the gear segment is in operative engagement with the teeth on the other plunger. The plungers are also provided with parts 13, arranged to co-act with the back face 11 of the gear segment, as will be more fully explained hereafter. Arranged in each chamber 3, and adapted to maintain the plungers in the position shown in Fig. 1, is a spring or resilient member 14. These springs each butt against a plunger at one end, and at the opposite end are arranged to bear against a nut 15, which is arranged on a bolt 16. The bolts 16 extend to the exterior of the plugs 5, and are rotatably carried thereby. Washers 17, preferably secured to the bolts, maintain the same from longitudinal movement when the bolts 16 are turned, thereby increasing or decreasing the tension of the spring members 14. Each plunger is preferably provided with a port 18, through the end thereof, as shown, having a valve member 19 arranged to permit the passage of fluid from the inside to the exterior side of the end of the plunger. Any type of check valve may be used, that shown consisting of a ball 19. The partition 4 is preferably provided with a duct 20 for each plunger, extending to proximate the end of the casing, the same being connected by a duct 21 to the chamber, as shown in Fig. 1. The passage of fluid through the ducts 20 and 21 is preferably controlled by needle valves 22, or their equivalents for the purpose. In addition to the ducts shown, I preferably connect the two chambers by a duct 24 (see Figs. 2 and 3) the passage of fluid therethrough being normally controlled by a needle valve 25, or its equivalent. In the partition 2 I preferably provide an opening or port 26, connecting the two chambers and an additional port 27, the passage of fluid through the lat-

ter being normally controlled by a needle valve 28, or its equivalent for the purpose.

In operation, as was before mentioned, the casing is secured to the fixed structure, and the shaft 6 to the movable part, as for example, the door. Shaft 6 may be connected to the door in any desired manner. It is preferably so connected that it will rotate when the door is swung, the shaft 6 being substantially a pivot pin carried by the door, and about the axis of which the door turns. The upper end of the door may be connected to the structure in any desired manner, and it is not necessary to illustrate and describe the same in detail. Assuming that the parts are as shown, if the door is swung in a direction which we may say is counter-clockwise, it rotates the shaft 6 and with it the gear segment 7. The corner of the gear segment at the back face 11 engages the plunger and moves the same until the teeth of the gear segment engage with the teeth of the plunger. The opposite plunger does not interfere with the operation of the gear segment, owing to the cutaway portion 12' previously mentioned. This moves the plunger a distance depending upon how wide the door is opened, compressing the spring. The oil contained within the plunger casing passes through the duct 18 and past the check valve 19, into the space between the end to the plunger and the casing. Some fluid may flow through the duct 20, 21. Any fluid in the spring end of the casing may pass through the duct 26 and duct 27. As is obvious, after the passage has shut off duct 26, the movement of the plunger will be checked to an extent depending upon the position of the needle valve 28. After the duct or port 27 is closed the oil is compressed between the end of the plunger and plug 5, checking the door suddenly, but at the same time cushioning it.

As soon as the door is released the spring tends to push the plunger back, the pressure maintaining the valve 19 closed. The oil at the plunger end flows through ducts 21 and 20, and past the door valve 22, checking the door in closing. Until the plunger has passed duct 24 some of the fluid oil passes through that duct into the other chamber, so that the initial movement of the door in returning is quicker than the final movement, so that the door is cushioned and brought to a stop. Owing to the flat side 11 of the gear segment first moving the plunger, either of the plungers are moved until the teeth are brought into engagement. The flat side 11 tends to bring the parts back to normal and maintain the door in its normal closed position. As is obvious, the device may be regulated by regulating the valves 22, 25 or 27, and the tension of the springs may be varied by adjusting the bolts 16.

The present device is extremely simple and compact, and consists of a minimum of parts, so that it does not easily get out of order. It may be regulated and adjusted for different doors and for different conditions met in the different installations. The tension of the two springs and the valves may be varied or made different so as to allow for different pressures at the two sides of the door, as for example, a wind pressure from without or the like.

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 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 door closing and checking device, the combination of a suitable oil containing casing provided with suitable partitions extending from each end, a plunger arranged on each side of one partition, said partition provided with a duct for each plunger chamber extending from proximate the end of the chamber to the end of the partition, and means for controlling the passage of fluid through said ducts.

2. The combination in a door closing and checking device, of a casing provided with communicating oil containing chambers therein, a plunger arranged in each chamber, means for normally yieldingly maintaining the plungers at one end of their respective chambers, said casing provided with ducts extending from the ends of the chambers toward the other end and opening thereinto, means for controlling the passage of fluid through said ducts, a shaft arranged to engage either plunger independently, said shaft extending to the exterior of the casing and arranged at its end for engagement with a movable cooperating part.

3. The combination in a door closing and checking device, of a casing provided with communicating oil containing chambers therein, a plunger arranged in each chamber, adjustable means controllable from the exterior of the casing for normally yieldingly maintaining the plungers at one end of their respective chambers, said casing provided with ducts extending from the ends of the chambers toward the other end and opening thereinto, adjustable means for controlling the passage of fluid through said ducts, a shaft arranged to engage either plunger independently, said shaft extending to the exterior of the casing and arranged at its end for engagement with a movable cooperating part.

4. The combination in a device of the kind described of a casing provided with

a partition extending lengthwise thereof, forming a plurality of chambers, a closure for each chamber, a plunger arranged in each chamber, each of said plungers provided with a plurality of teeth thereon and with a valved duct at one end, means for yieldingly maintaining said plungers at one end of each of their respective chambers, said partition at said plunger end of the casing provided with a duct for each chamber extending from the end of the casing toward the other end, and opening into said chambers, and with a duct extending through the partition connecting the plunger chambers, and means for controlling the passage of fluid through said ducts, a gear segment arranged in said casing and arranged to engage either plunger independently of the other, said gear segment provided with a shaft projecting to the exterior of the casing and arranged for attachment with a movable part.

5. The combination in a device of the kind described of a casing provided with a partition extending lengthwise thereof from each end, forming a plurality of chambers, a detachable closure for each chamber, a plunger arranged in each member, each of said plungers provided with a plurality of teeth thereon and with a valved duct at one end, adjustable means controllable from the exterior of the casing for yieldingly maintaining said plungers at one end of each of their respective chambers, said partition at said plunger end of the casing provided with a duct for each chamber extending from the end of the casing toward the other end, and opening into said chambers, and with a duct extending through the partition connecting the plunger chambers, and means for controlling the passage of fluid through said ducts, a gear segment arranged in said casing and arranged to engage either plunger independently of the other, said gear segment provided with a shaft projecting to the exterior of the casing and arranged for attachment with a movable part.

6. The combination in a device of the kind described of a casing provided with a partition extending lengthwise thereof, forming a plurality of chambers, a closure for each chamber, a plunger arranged in each chamber, each of said plungers provided with a plurality of teeth thereon and with a valved duct at one end, means for yieldingly maintaining said plungers at one end of each of their respective chambers, said partition at said plunger end of the casing provided with a duct for each chamber extending from the end of the casing toward the other end, and opening into said chambers, and with a duct extending through the partition connecting the plunger chambers, and means for controlling the passage of fluid through said ducts, the partition at the opposite end

of the casing provided with a plurality of ducts therethrough, and means for controlling the passage of fluid through one of said ducts, a gear segment arranged in said casing and arranged to engage either plunger independently of the other, said gear segment provided with a shaft projecting to the exterior of the casing and arranged for attachment with a movable part.

7. The combination in a device of the kind described of an oil containing casing provided with a plurality of chambers therein, and with closures for the ends of said chambers, a plunger arranged in each chamber at the end opposite said closures, means for resiliently maintaining said plungers at the ends of their respective chambers including an adjustable member extended through each closure, a shaft extending into said casing and provided with means for directly engaging either of said plungers, means for controlling the operation of either plunger after a predetermined travel of the same when actuated by said shaft, and means for controlling the return of said plungers to normal position when returned by said resilient means.

8. The combination in a checking device of a casing having a plurality of adjacent communicating chambers, a plunger arranged in each chamber, adjustable means for yieldingly maintaining said plungers in operative position, said plungers cut away on adjacent sides, and formed with gear teeth therein, a gear segment arranged within the casing and provided with teeth arranged to engage with the teeth on said plungers, and means for controlling the movement of said plungers in either direction.

9. The combination in a checking device of a casing having a plurality of adjacent communicating chambers, a plunger arranged in each chamber, adjustable means for yieldingly maintaining said plungers in operative position, said plungers cut away on adjacent sides, and formed with gear teeth therein, a portion of one tooth on each plunger partially cut away, a gear segment arranged within the casing and provided with teeth arranged to engage with the teeth on said plungers, said gear segment having a flat face at one side, and said plungers overlying said face, and means for controlling the movement of said plungers in either direction.

10. In a door closer and check, the combination of a suitable oil containing casing provided with a plurality of chambers therein, divided by a suitable partition, a plunger arranged in each chamber, said partition provided with a plurality of ducts extending proximate the end of the chambers to the end of the partition, means for controlling the passage of the fluid through said

ducts, said partition provided with a duct
connecting the plunger chambers, means for
controlling the passage of fluid through said
last mentioned duct, means for normally
5 maintaining said plungers at the end of
their respective chambers, and a shaft pro-
jecting from within the chamber to the ex-
terior thereof, said shaft provided with
means for engaging either of said plungers.
10 11. The combination in a door closing and
checking device with an oil containing cas-
ing provided with oil containing chambers,
conveying ducts therein, a plunger arranged
15 in each chamber, means for yieldingly op-
posing the movement of the plungers and
maintaining the same in normal positions,
comprising a spring for each plunger, means

extending to the exterior of the casing for
independently controlling the tension of
either spring, means for controlling the pas- 20
sage of fluid through said ducts, and a shaft
having a gear segment arranged to directly
engage either plunger independently of the
other, said shaft extending to the exterior of
the casing and arranged at its end for en- 25
gagement with a movable cooperating part.
In testimony whereof, I have hereunto
signed my name in the presence of two sub-
scribing 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."