

July 18, 1933.

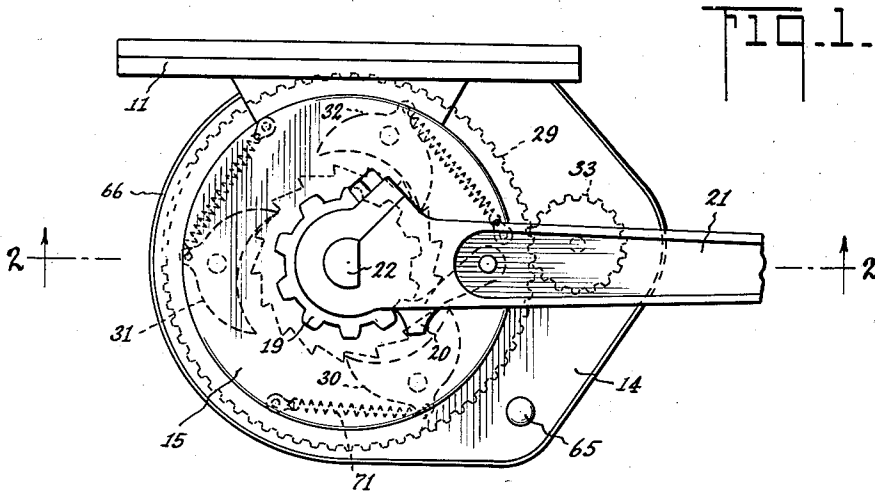
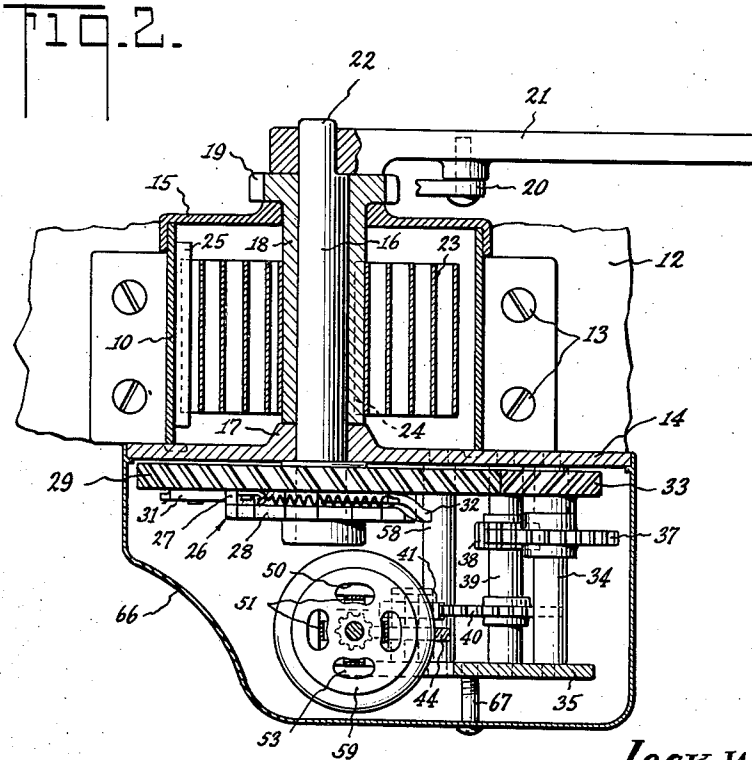
J. WELTON

1,918,879

DRY DOORCHECK

Filed Feb. 25, 1931

2 Sheets-Sheet 1



WITNESS:
A. J. Mank

JACK WELTON
INVENTOR
BY *Victor J. Evans*
and Co. ATTORNEYS

July 18, 1933.

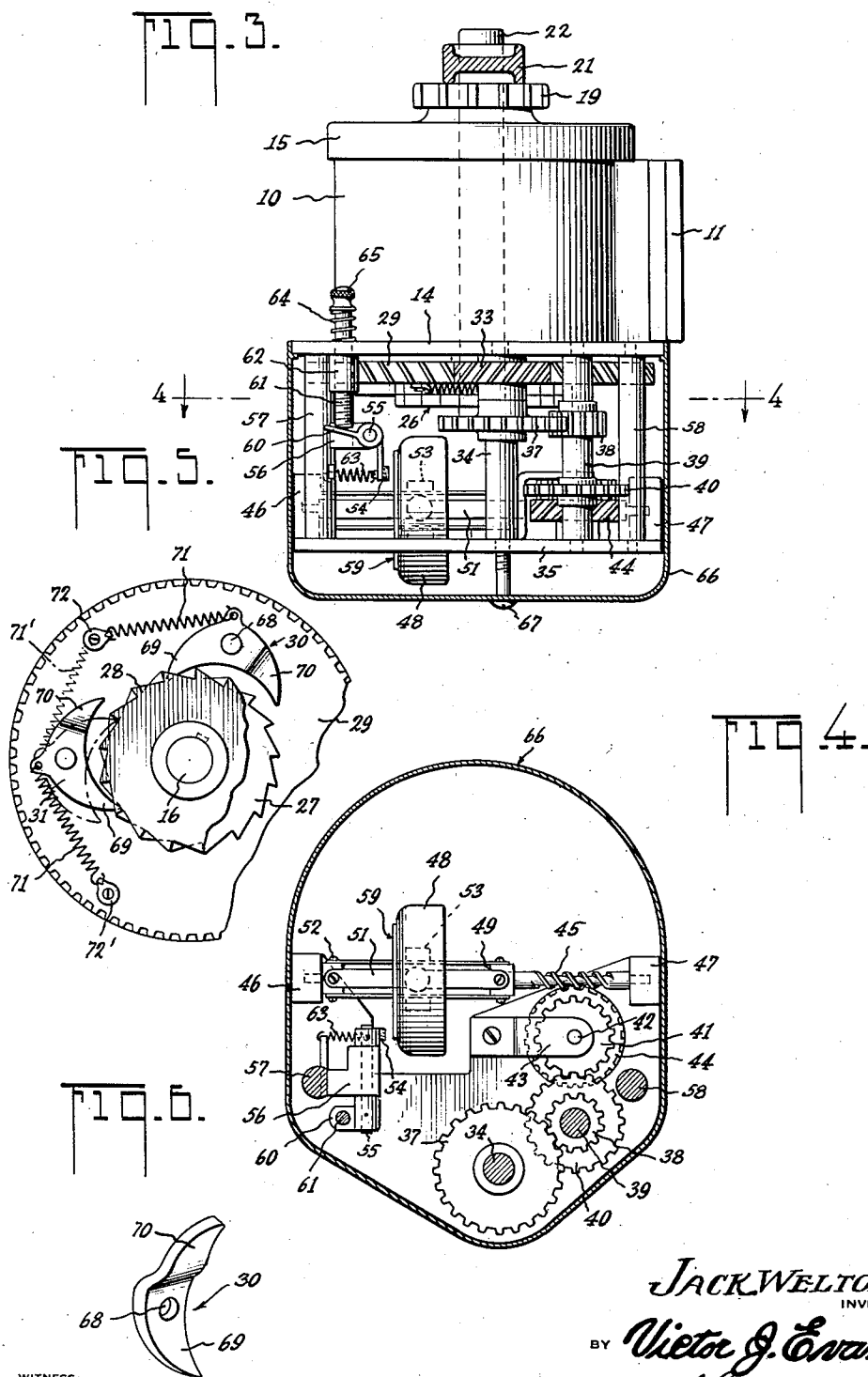
J. WELTON

1,918,879

DRY DOORCHECK

Filed Feb. 25, 1931

2 Sheets-Sheet 2



WITNESS:
J. Frank

JACK WELTON
INVENTOR
BY Victor J. Evans
and Co. ATTORNEYS

UNITED STATES PATENT OFFICE

JACK WELTON, OF NEW YORK, N. Y.

DRY DOORCHECK

Application filed February 25, 1931. Serial No. 518,174.

This invention relates to door checks and closers for automatically closing doors and the like, while at the same time retarding the closing movement of the door to prevent slamming.

The primary object of the invention resides in the provision of a dry door check and closer, i. e., a device of this character which functions without the use of liquid or air for cushioning or retarding purposes.

Another object of the invention is the provision of a dry door check in which a coiled spring is employed for the storage of energy during the opening movement of the door, mechanically operated means being employed to retard the action of the spring during the closing movement of the door.

Still another object of the invention resides in the provision of a centrifugal governor for regulating the speed of the door closing movement, adjustable friction means being provided to control the speed of the centrifugal governor.

Yet another object of the invention is to enable the dry door check to be reversible, for use with doors opening at the right or left hand side.

A further object of the invention is to simplify and improve the construction of door checks generally and to provide a door check which is positive and efficient in its action, not likely to get out of order, which will require practically no attention after its installation except for adjustment, and which will be rugged and long wearing in use.

Other objects and advantages of the invention will be hereinafter specifically pointed out, or will become apparent, as the specification proceeds.

With the above indicated objects in view, the invention resides in certain novel constructions and combinations and arrangement of parts, clearly described in the following specification and fully illustrated in the accompanying drawings, which latter show an embodiment of the invention as at present preferred.

In said drawings:

Fig. 1 is a top plan view of the door check;

Fig. 2 is a vertical sectional view through the door check on the line 2—2 of Fig. 1;

Fig. 3 is a side elevation of the door check, with a portion of the gear casing removed to more clearly show the parts within;

Fig. 4 is a transverse sectional view through the gear casing, on the line 4—4 of Fig. 3;

Fig. 5 is a partial bottom plan view illustrating the reversible pawl and ratchet mechanism for use in winding up the spring; and

Fig. 6 is a perspective view of one of the double-acting pawls which cooperate with the ratchet.

The door check in this instance includes a cylindrical casing 10 having a securing plate 11 at its rearward side for use in attaching the door check to the side of a door or the like 12, as by means of screws 13. The casing 10 is provided with an outwardly extending base plate 14 and a cover 15.

A shaft 16 is positioned within the casing 10, the base plate 14 having an elevated portion 17 providing a bearing for the lower end of the shaft 16. The shaft 16 is surrounded by a cylindrical cup or hub portion 18 which extends through the cover 15 and rests upon the elevated portion 17 of the base plate 14. This cylindrical cup 18 is equipped with a ratchet 19 at its outer end, this ratchet 19 being adapted to cooperate with a pawl 20 provided on an operating arm 21 secured to the upper end of the shaft 16, as indicated at 22. The arm 21 is linked to a second arm (not shown) which is usually secured to the door frame.

To store energy for producing the closing movement of the door, a coiled ribbon spring 23 is provided within the casing 10, the inner end of the spring 23 being preferably suitably enlarged for reception in an elongated socket 24 as seen in dotted lines in Fig. 2, and the outer end of the spring being desirably similarly enlarged for reception in an elongated socket provided in a lug 25 at the inner wall of the casing 10.

As a preliminary in attaching the door check to the door, the arm 21 is first preferably operated to position the pawl 20 on the ratchet 19 so that the spring 23 will be put under slight tension, under which the spring

normally remains when the door is closed, such slight tension being necessary to insure positive closing of the door at the end of the closing movement produced by the force of the spring 23.

Mechanical, "dry" means are provided to retard the closing movement of the door 12 under the influence of the spring 23. For this purpose the lower end of the shaft 16 has a ratchet 26 pinned thereto, this ratchet 26 having two sets of reversely faced teeth 27 and 28, the purpose of which will presently more clearly appear.

To transmit the force of the wound spring 23 to the retarding means, a large diameter loose gear 29 is loosely mounted on the shaft 16 between the ratchet 26 and the base plate 14. This large diameter loose gear 21 carries a plurality of pivotally mounted pawls 30, 31 and 32, which are adapted to successively engage one set of teeth 27 or 28 of the ratchet 26, whereby the rotative movement of the shaft 16 produced by the unwinding movement only of the spring 23 will be communicated to the large loose gear 29.

The large diameter loose gear 29 meshes with a smaller gear 33 loosely mounted on a vertical shaft 34 the ends of which are secured between the base plate 14 and a bottom plate 35 provided at the lower part of the door check. This smaller gear 33 is connected, by means of an integral sleeve 36 surrounding the shaft 34, with a spur gear 37 which meshes with a pinion 38 keyed to a second shaft 39, the opposite ends of which are rotatably mounted in the base plate 14 and bottom plate 35. This shaft 39 also carries a large toothed wheel 40 which meshes with a pinion 41 mounted on a short shaft 42 having bearings in the plate 35 and in an upstanding bracket 43 secured to the bottom plate 35.

The short-shaft 42 also carries a worm wheel 44 which meshes with a worm shaft 45 mounted in bearing blocks 46 and 47 upstanding from the bottom plate 35. This worm shaft 45 carries a centrifugal governor including a hollow casing 48 having an integral sleeve portion 49 slidably mounted on the worm shaft 45. The governor casing 48 is provided with a plurality of openings 50 in its front wall. A plurality of spring arms 51 extend through the openings 50, one end of each spring arm 51 being fixedly secured to one end of the worm shaft, as indicated at 52, and the opposite end of each of the spring arms being connected to the slidable sleeve portion 49. A weight 53 is intermediately carried by each of the spring arms 51, the weights being housed within the interior of the hollow casing 48.

Unwinding movement of the spring 23 during the closing movement of the door will produce rotation of the worm shaft 45, through transmission of the energy of the spring 23 by the train of gears hereinabove

described. This will also produce rotation of the centrifugal governor arms 51, with their attached weights 53. The centrifugal force induced by rotation of the weights will cause the weights to move outward through a wider circular path, and this outward movement of the weights will bend the arms 51 and thus shorten their effective length. This will effect movement of the governor casing 48 toward the end of the governor shaft where the arms 51 are fixedly secured as indicated at 52. The governor casing will move endwise different distances depending on the speed of the worm shaft, as will be understood.

Means are provided to control the speed of the governor by resisting and limiting the outward or endwise movement of the governor casing, so that a limit may be placed on the maximum closing speed of the door. For this purpose I provide means to frictionally engage the front wall of the governor casing, said means including a brake shoe 54 having an integral shaft 55 pivotally mounted in a bracket 56 provided on a post 57 which extends between the base plate 14 and bottom plate 35. This post 57, together with a second post 58, serves to connect the bottom plate 35 to the base plate 14.

Means are provided to move the brake shoe 54 toward and from the front face 59 of the governor casing 48. The brake shoe shaft 55 is provided with a toe 60 adapted to be engaged by the end of an adjustment screw 61 threaded through the base plate 14 as indicated at 62, inward movement of the screw 61 causing partial rotation of the shaft 55 to move the brake shoe 54 into closer proximity to the front face 59 of the governor casing. Movement of the brake shoe away from the governor casing is accomplished by means of a tension spring 63 connected to the brake shoe and also to the post 57. The adjustment screw 61 is preferably provided with a stop pin or equivalent means to limit its outward movement, and a spring 64 may surround the screw between the base plate 14 and the knurled thumb-piece or bead 65 to assist in maintaining the adjustment of the screw in its set position.

The several intermeshing gears, worm shaft and centrifugal governor are enclosed by a cover 66 which fits around the outer edge of the base plate 14 and is secured in place by a suitable screw 67 extending into the bottom plate 35.

The pawl and ratchet mechanism for transmitting the energy of the wound spring 23 to the train of gears connected to the centrifugal governor will now be described in more detail. Referring more particularly to Figs. 1, 5 and 6, it will be seen that each of the pawls 30, 31 and 32 is pivotally mounted as seen at 68 upon the large gear

29. Each pawl has an inner tooth 69 to engage the teeth 27 of the ratchet 26, and an offset tooth 70 to engage the ratchet teeth 28. Each pawl is held in position so that one of its teeth engages one of the series of ratchet teeth by means of a coiled spring 71 removably secured to a pivoted hook plate 72.

As already stated, the ratchet teeth 27 and 28 face in opposite directions; and this is to assist in enabling the door check to operate in opposite directions as may be required. When it is desired to reverse the action of the door check from the position shown in the drawings, the arm 21 is disconnected from the shaft 16, and the cover 15 and cup 18 are removed from the casing 10 together with the spring 23. The spring 23 is then removed from the cup 18 by simply sliding the inner end of the spring out of the socket 24, turning the spring upside down and replacing it upon the cup. The parts are now reassembled, with the outer end of the spring positioned in the socket of the lug portion 25. The spring will now wind up in the opposite direction, during opening of the door to which it is secured; and it is consequently necessary to reverse the action of the ratchet 26 to correspond.

To accomplish reversal of the ratchet the pawl springs 71 are disconnected from their respective hook plates 72, and the springs are re-connected to the hook plates 72 at the opposite side of each pawl. This will swing the pawls around so that instead of the teeth 69 engaging the ratchet teeth 27, the offset pawl teeth 70 will engage the ratchet teeth 28. This reversal of the pawls is indicated in dotted lines in Fig. 5, wherein the spring 71' of the pawl 31, initially connected to the hook plate indicated at 72', is removed from the hook plate 72' and reconnected to the hook plate shown at 72, all the pawls being similarly reversed. The reversal is accomplished quickly and with facility, and enables the door check to be used with a door opening in either a right hand or left hand direction.

Considerable particularities of description, as to materials; part details, dimensions, capacities and utilities may have been herein indulged in, but it will be understood that these statements, made with particular reference to that one, and the one now preferred, of the many possible embodiments of the invention which is illustrated in the drawings, are not in any way to be taken as definitive or limitative of the invention. Inasmuch as many changes could be made in the above constructions, and many apparently widely different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language contained in the following claims is intended to cover all the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

In other words, the scope of protection contemplated is to be taken solely from the appended claims, interpreted as broadly as is consistent with the prior art.

What I claim as new is:

1. A device for the purpose indicated comprising a housing adapted for connection with a door, an arm adapted for operative connection with the door frame, a shaft journaled in the casing and having the arm mounted thereon, a spring enclosed by the casing and tending to impart angular or turning movement to said shaft, a gear loosely mounted on said shaft, a rotary member having means to retard its rate of rotation, and reduction gearing connecting said gear with said member, reversely disposed ratchet wheels secured to said shaft, and double-nosed pawls mounted on said gear and provided with springs selectively attachable to different anchoring points on said gear to selectively dispose either nose of the pawls to one of the ratchet wheels on said shaft.

2. A device for the purpose indicated comprising a housing adapted for connection with a door, an arm adapted for operative connection with the door frame, a shaft journaled in the casing and having an arm mounted thereon, a spring enclosed by the casing and tending to impart angular or turning movement to said shaft, a governor mechanism operatively connected with the shaft to control the rate of angular or turning movement thereof, reversely disposed ratchet wheels secured to said shaft, and a double-nosed pawl carried by said governor mechanism and provided with a spring selectively attachable to different anchoring points on said mechanism to selectively dispose either nose of the pawl to one of the ratchet wheels.

3. A device for the purpose indicated comprising a housing adapted for connection with a door, an arm adapted for operative connection with the door frame, a shaft journaled in the casing and having an arm mounted thereon, a spring enclosed by the casing and tending to impart angular or turning movement to said shaft, a governor mechanism operatively connected with the shaft to control the rate of angular or turning movement thereof, reversely disposed ratchet wheels secured to said shaft, and a double-nosed pawl carried by said governor mechanism and provided with a spring selectively attachable to different anchoring points on said mechanism to selectively dispose either nose of the pawl

to one of the ratchet wheels, the ratchet wheels being disposed in side contact with each other and the pawl lying in the plane of one with one nose offset to lie in the plane of the other.	
5	4. A device for the purpose indicated comprising a housing adapted for connection with a door, an arm adapted for operative connection with the door frame, a shaft jour-
10	nalled in the casing and having an arm mounted thereon, a spring enclosed by the casing and
15	tending to impart angular or turning movement to said shaft, a governor mechanism operatively connected with the shaft to control the rate of angular or turning movement thereof, reversely disposed ratchet wheels se-
cured to said shaft, and a double-nosed pawl carried by said governor mechanism and provided with a spring selectively attachable to different anchoring points on said mechanism to selectively dispose either nose of the pawl	
	to one of the ratchet wheels, the ratchet wheels being disposed in side contact with each other and the pawl lying in the plane of one with one nose offset to lie in the plane of the other, the pawl being crescent-shaped with its noses at the extremities of the crescent and the spring being connected with the pawl at an intermediate point between the noses thereof.
JACK WELTON.	
20	80
	85
25	90
	95
30	100
	105
35	110
	115
40	120
	125
45	130
50	
55	
60	
65	