No. 805,775. PATENTED NOV. 28, 1905.

G. J. BLUM.

DOOR CHECK.

APPLICATION FILED APR. 15, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

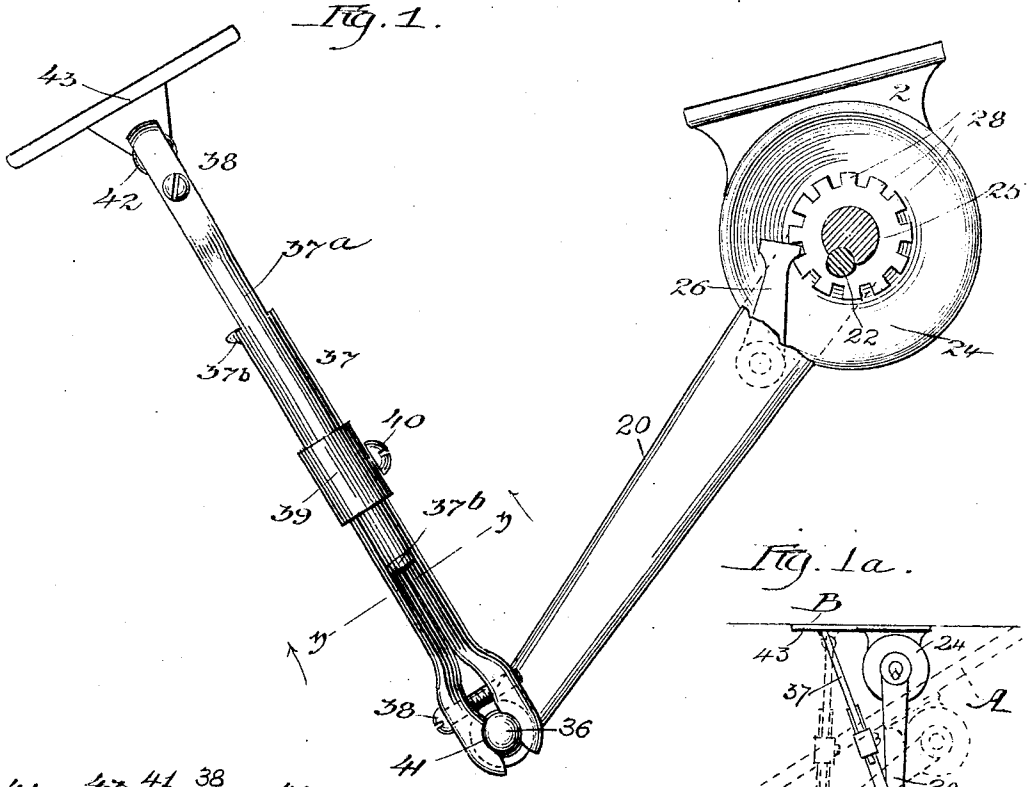


Fig. 1a.

Fig. 2.

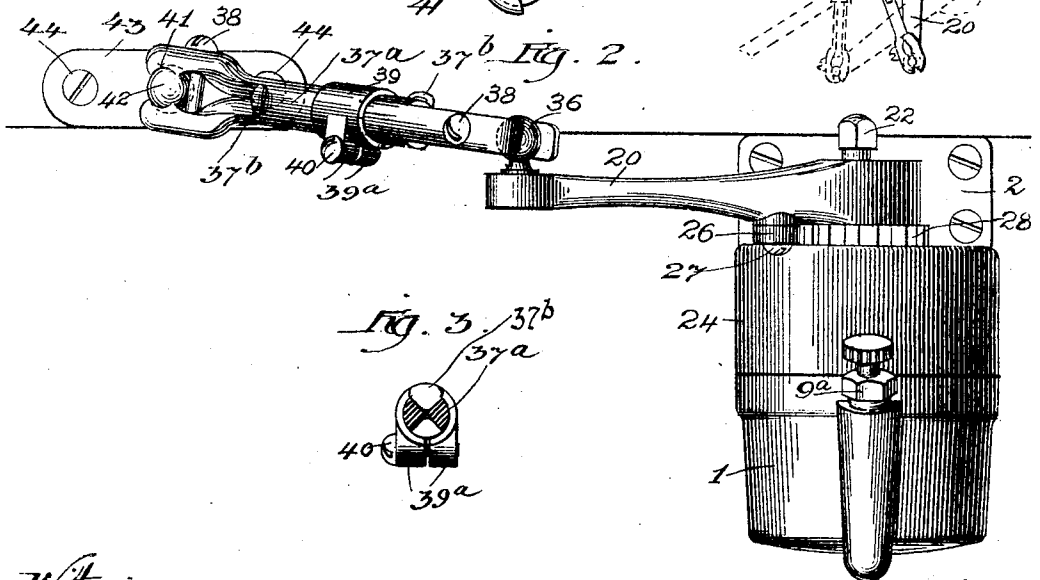


Fig. 3.

Witnesses:

Frank S. Blanchard

George L. Chindahl

Inventor:

George J. Blum

By Luther L. Miller

Attorney.

No. 805,775. PATENTED NOV. 28, 1905.

G. J. BLUM.

DOOR CHECK.

APPLICATION FILED APR. 15, 1904.

2 SHEETS—SHEET 2.

Fig. 4.

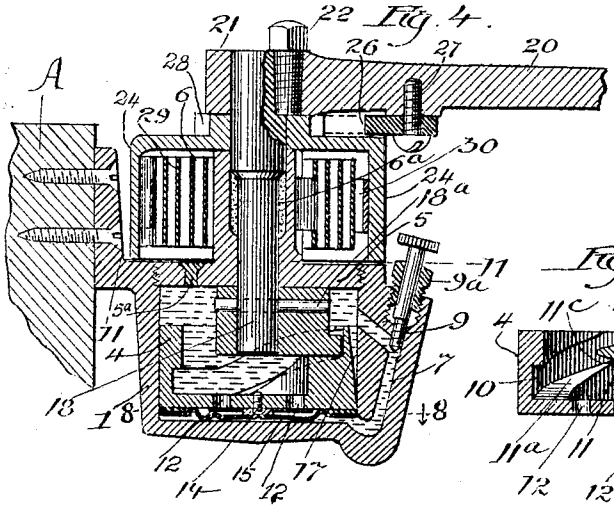


Fig. 5.

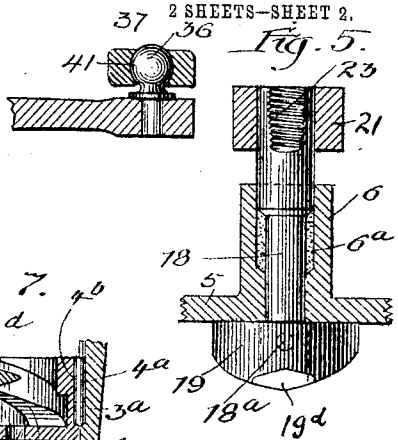


Fig. 7.

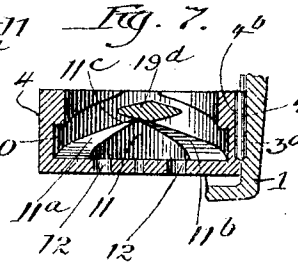


Fig. 8.

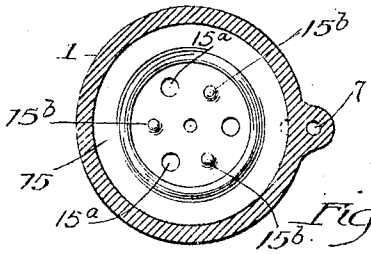


Fig. 9.

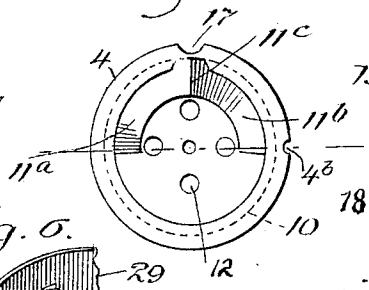


Fig. 10.

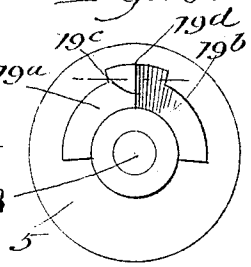


Fig. 6.

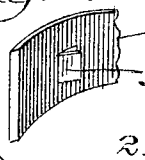


Fig. 11.

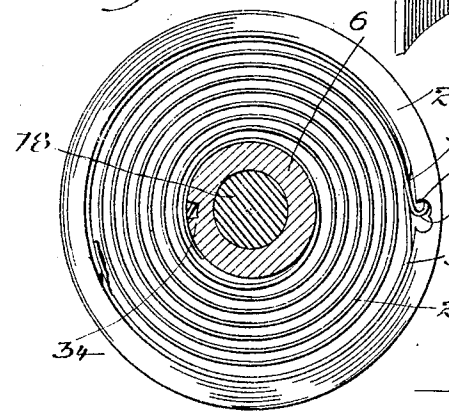


Fig. 12.

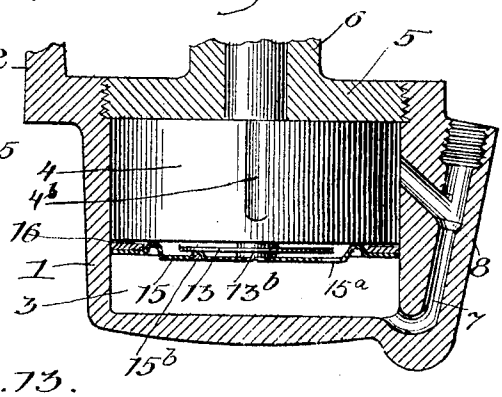
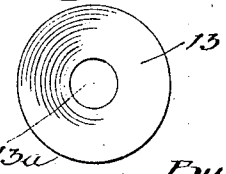


Fig. 13.



Witnesses:

Frank L. Blanchard

George L. Chindahl

Inventor:

George J. Blum

By Luther L. Miller

Attorney.

UNITED STATES PATENT OFFICE.

GEORGE J. BLUM, OF CHICAGO, ILLINOIS.

DOOR-CHECK.

No. 805,775. Specification of Letters Patent. Patented Nov. 28, 1905.

Application filed April 15, 1904. Serial No. 203,296.

To all whom it may concern:

Be it known that I, GEORGE J. BLUM, 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-Checks, of which the following is a specification.

This invention, as stated, relates to door-checks, and has for one of its objects the production of a simple positively-acting door-check.

The invention further refers to an improved means for attaching the door-closing spring to the movable parts of the mechanism in order to prevent breakage of the spring.

The invention further relates to an improved means for moving the oil-piston, to an improved valve in said piston, and to an improved by-pass for the oil.

The invention also refers to a new and improved adjustable arm for door-checks.

The invention further relates to the various improvements in detail in the form, construction, and arrangement of the parts of the check hereinafter more fully pointed out.

In the accompanying drawings, Figure 1 is a top plan view of a door-check as applied to a door and door-casing. Fig. 1^a is a diagrammatic view showing in full lines the position of the check when the door is closed and in dotted lines its position when the door is open. Fig. 2 is a side elevation of the check. Fig. 3 is a transverse sectional view taken through the connecting-link on dotted line 3 3 of Fig. 1. Fig. 4 is a vertical central section through this improved door-check. Fig. 5 is a vertical fragmental central section through the upper part of the door-check, showing the shaft and cam-head in elevation. Fig. 6 is a detail perspective view of the inner end of the closing-spring. Fig. 7 is a vertical section taken through the piston in the oil-cylinder, showing the cam therein, the cam-groove in the peripheral wall of the cylinder, and the nose upon the cam-head in section. Fig. 8 is a horizontal section through the oil-cylinder, taken on dotted line 8 8 of Fig. 4. Fig. 9 is a top plan view of the piston. Fig. 10 is an under face view of the cam-head and the stopper-disk of the oil-cylinder. Fig. 11 is a horizontal section through the spring-casing on dotted line 11 11 of Fig. 4. Fig. 12 is a vertical central section through the oil-cylinder on a scale somewhat larger than that of Fig. 4. Fig. 13 is an under face view of the valve-disk.

A refers to a portion of a hinged door, and B to a portion of the door-frame.

In the construction of a door-check embodying my invention I provide an oil-casing 1, having an integral ear 2, by means of which said casing is secured to a door or a door-jamb. In the casing an oil-cylinder 3 is formed, and in the cylinder is movably seated a piston 4. A pin 4^a, lying within coinciding grooves 3^a and 4^b in the cylinder and piston, respectively, prevent rotation of the piston with relation to the oil-cylinder. The upper end of the oil-cylinder is closed by means of a stopper-disk 5, having a screw-thread engagement with the inner walls of said cylinder, which disk also has an integral upwardly-extending sleeve 6. A packing-space 6^a is formed in the sleeve 6 to receive suitable packing for preventing the passage of oil upward through said sleeve. Oil may be introduced into the oil-cylinder 3 through a filling-opening 5^a, adapted to be closed by the screw 5^b. The casing 1 is provided with a by-pass opening 7, forming a communication between the upper part and the lower part of said cylinder, opening above and below the piston 4. The by-pass 7 is provided at an angle in its course with a valve-seat 8 and a closure 9, said closure in this instance being in the form of a threaded valve-stem having a stuffing-box (9^a) connection with said casing.

The piston 4 is of hollow cylindrical construction and has in its inner peripheral walls a cam-groove 10. It is also provided with a cam-surface 11, corresponding with the cam-groove 10 and having two inclines 11^a and 11^b and an apex 11^c. The piston 4 is also provided with valve-openings 12, extending through it, which valve-openings are adapted to be closed by a metallic disk 13, centrally perforated at 13^a and mounted upon a guide core or washer 13^b, which core is held in position by means of a screw 14, lying within a suitable screw-threaded opening in the lower face of said piston. The screw 14 also holds a cage 15 in position upon the lower side of said piston, which cage consists of a plate having openings 15^a for the passage of the oil and integral bosses 15^b, intended to limit the movement of the disk 13 with relation to the valve-openings 12. Between the piston 4 and the cage 15 is a washer or packing-ring 16. In the outer peripheral wall of the piston 4 a vertical groove 17 is provided, adapted to coincide with the upper end of the by-pass opening 7 to permit the passage of oil from said

by-pass into the upper portion of the cylinder 3 when the piston is forced downward.

A shaft 18 lies within the sleeve 6 and upon its lower end carries a cam-head 19, rigidly secured to said shaft by means of a pin 18^a. The cam-head 19 has the two inclined surfaces 19^a and 19^b and the apex 19^c, and from the side of the cam at said apex extends a nose 19^d, which nose is adapted to lie within the groove 10 in the interior walls of the piston 4.

An operating-arm 20 is provided with a hub 21, which surrounds the upper end of the shaft 18, and said arm is secured to said shaft by means of a tapered set-screw 22, passing through a screw-threaded opening 23, formed partially in the hub 21 and partially within the shaft 18. Between the arm 20 and the casing 1 the shaft 18 carries a spring-casing 24, loosely mounted upon the shaft by means of its hub 25, but having a connection with the arm 20 by means of a double-nose pawl 26, pivotally mounted upon the under side of said arm by means of the screw 27 and engaging teeth 28, formed upon the hub 25.

A door-closing spring 29 is adapted to be placed within the spring-casing 24, which spring is provided with a retaining-band 30, adapted to surround the spring and prevent its undue expansion. Near the inner end of the spring a tang cut therefrom is turned inwardly in a hook 31, (see Fig. 6,) and the outer end of the spring, as shown in Fig. 11, is turned outwardly in a hook 32. The retaining-band 30 is narrower than the spring, as shown in Fig. 4, and passes through an opening 33 in said spring near said last-mentioned hook, as shown in Fig. 11. The hook-shape tang 31 of the spring is adapted to project within the vertical groove 34, formed in the sleeve 6, and the outer end of the spring engages the groove 35, formed in the inner wall of the spring-casing 24.

The outer end of the arm 20 is provided with a ball-stud 36 of a ball-and-socket joint to be next described.

The outer end of the arm 20 is connected with the door-casing or the door by means of a longitudinally-adjustable link 37, made up of four longitudinal sections 37^a of quadrant form in cross-section. Said sections are secured together side by side in pairs by means of screws 38, passing through an opening in one of the sections of each pair and entering a screw-threaded opening in the other section. The free ends of said sections lie side by side, together forming a cylindrical stem, and are surrounded and held together by means of a clamping-collar 39, having a tightening-screw 40, extending through perforated ears 39^a, with one of which ears it has a screw-thread connection. The outward or lengthening movement of the arm-sections is limited by integral lugs 37^b, formed on one of each pair of arm-sections, which lugs are adapted to abut against the collar 39. A socket 41 is formed between the outer ends of each pair of sections 37^a, one of said sockets being adapted to receive the ball-stud 36 of the arm 20, and the other socket to receive a similar ball-stud 42, formed integral with a bracket 43, secured to the door-jamb by means of the screws 44. To adjust the length of the link 37, the clamping-collar 39 is loosened by loosening the screw 40, when the two pairs of sections 37^a may be longitudinally moved within said collar and with relation to each other, increasing or diminishing the distance between the ends of said link.

In assembling the door-check oil is placed within the oil-cylinder 3, the piston 4 inserted into said cylinder upon its guide-pin 4^a, a strip of leather or other suitable packing placed around the shank of the shaft 18, said shaft inserted within the sleeve 6 of the disk 5, and the cam-head 19 fixed to the end of said shaft by means of the pin 18^a. The cam-head 19 is placed in the hollow upper portion of the piston 4 and the stopper-disk 5 secured into position in the upper end of the oil-cylinder. The check is then secured to the door or to the door-jamb by means of the attaching-ear 2, and the spring-casing 24, with the spring 29 previously placed therein, is put upon the upper end of the shaft 18. The arm 20 is then secured to the upper end of said shaft by means of the taper set-screw 22, and the free end of the link 37 is connected with the door or door-jamb, as the case may be, by means of its bracket 43. The length of the link is properly adjusted by loosening the screw 40 of the clamping-collar 39 and moving the two pairs of arm-sections 37^a with relation to each other until the length of the link is made suitable for the position of the check upon the door. The spring 29 is wound up to a sufficient tension, and the double-nosed pawl 26 is placed in engagement with the teeth 28 upon the hub of the spring-casing 24.

When the door is in its closed position, the parts are in the position shown in Fig. 4, with the piston 4 in its lowest position and the main body of oil in the upper portion of the cylinder 1. When the door is opened, the spring-casing 24 is turned with the arm 20, and the opening of the door thus is resisted by the spring 29. The shaft 18 also being rotated with the arm 20, the cam-head 19, secured to said shaft, is rotated, its nose 19^d moving through the cam-groove 10 and raising the piston 4. The weight of the oil in the upper part of the cylinder 1 moves the valve-disk 13 to uncover the openings 12, and thereby permit the oil to pass freely to the lower part of the cylinder. The valve-disk 13 is free to move toward and from said openings upon its guide-core 13^b, the outward movement of said disk being limited by the cage 15, when the door A is released and spring 29 rotates the arm 20 and the shaft 18 to their first or starting position. In this ro-

tation of the shaft 18 the nose 19^d of the cam-head 19, secured thereto, is moved into contact with one of the cam-surfaces 11^a 11^b, forcing the piston 4 downward within its cylinder. The pressure of the oil in the lower part of the cylinder forces the valve-disk 13 against the openings 12 in said piston. Continuing downward movement of the piston 4 drives the oil slowly through the by-pass opening 7 into the upper part of the cylinder, checking the closing movement of the door. The freedom of movement of the oil from the lower to the upper part of the cylinder is regulated by the valve 9, governing the by-pass opening 7.

The spring 29 is changed for the change in application of the closer from a right to a left hand door by removing it from the spring-casing 24 and turning it over. In checks of the same general form as the one illustrated the spring is frequently broken when the check is first applied to the door from being flexed in the wrong direction, there being no way to ascertain before the closer is applied and tried which way the spring is set to operate. By my improved connection between the inner end of the spring and the sleeve 6 the tang 31 upon said spring merely slides out of the vertical groove 34 in said sleeve when the spring-casing is rotated in the wrong direction and the check fails to operate. Owing to the fact that the projection or tang 31 has an inclined face, it will cause the inner end of the spring to be automatically disconnected from the sleeve 6 if the spring-casing is rotated in the wrong direction, regardless of whether the device is adjusted or assembled for a right or left hand door. Of course the end of the tang or projection will hook against either side wall of the recess 34, according to which way the spring is put in place, and then if the spring is wound the wrong way the inclined face of said projection will ride over the angle formed at the juncture of the opposite side wall of the recess with the outer surface of the sleeve, and thus avoid risk of breaking the spring.

In the drawings the check is arranged to exercise the entire strength of the spring at the instant of closing the door. This is effected by affixing the cam-head 19 to the shaft 18 in such position that it will pass the apex 11^e of the cam-surface 11 just prior to its final movement, so that the checking action of the oil in the lower end of the oil-cylinder is relieved and the door released to the action of the spring at the moment of its closing.

It will be understood that the casing 1 may be secured to the door or to the door-jamb, according to the requirements of each case, the bracket 43 being of course secured to the alternate member.

The valve-disk 13 is light and thin, and during the downward movement of the piston the pressure of the oil within the lower part of the cylinder forces the disk tightly against the valve-openings 12 and closes them. During the upward movement of the piston the oil passing through the valve-openings 12 forces the disk away from said openings and permits the oil to flow freely into the lower part of the oil-cylinder. The pawl 26 may be turned so that either one of its two noses is in engagement with the teeth 28, according as the check is to be used on a right or left opening door.

My invention is not restricted to the precise construction and arrangement of parts shown and described herein, as such construction and arrangement may be modified or varied by those skilled in the art without departing from the spirit and scope of my invention.

I claim as my invention—

1. In a door-check, in combination, a door-closing mechanism comprising a coiled spring upon the inner end of which is a projection having an inclined face, a fixed member having a recess therein in which said projection is adapted to project and from which it is adapted to slip upon being moved in a certain direction, and a rotatable support for the outer end of said spring; and a checking mechanism for said door-closing mechanism.

2. In a door-check, in combination, a door-closing mechanism comprising a coiled spring, the inner portion of which is provided at a little distance from its end with an inclined tang punched from the substance of said spring, a fixed member having a recess therein in which said tang is adapted to project and from which it is adapted to slip upon being moved in a certain direction, and a rotatable support for the outer end of said spring; and a checking mechanism for said door-closing mechanism.

3. In a door-check, in combination, a door-closing mechanism comprising a rotatable spring-casing having a recess in its inner walls; a coiled spring lying within said casing and having its hooked outer end lying in said recess, a fixed member to which the inner end of said spring is releasably connected, said spring having an opening therein near its outer end, and a band surrounding said spring and passing through said opening, said spring being adapted to be withdrawn from said casing, inverted and replaced; and a checking mechanism for said door-closing mechanism.

4. In a reversible door-check, in combination, a door-closing mechanism comprising a rotatable spring-casing, a coiled spring lying within said casing and having its outer end releasably connected therewith, the inner portion of which spring is provided at a little distance from its end with a projection having an inclined face, a fixed member having a recess therein in which said projection is adapted to project and from which it is adapted to slip

upon a rotation of the spring-casing in a certain direction; and a checking mechanism for said door-closing mechanism.

5. In a door-check, in combination, a closing mechanism; and a checking mechanism comprising a member having a valve-opening therein, a stud on said member, a valve-disk slidably supported on said stud and adapted to cover said valve-opening, and a valve-cage fixed with relation to said stud and adapted to limit the extent of the movement of said valve-disk in one direction.

6. In a door-check, in combination, a closing mechanism; and a checking mechanism comprising an oil-cylinder, a piston therein having a plurality of valve-openings extending through it, a stud on said piston, a valve-disk slidably supported on said stud and adapted to cover said valve-openings, a valve-cage fixed with relation to said stud and having projections adapted to limit the extent of the movement of said valve-disk in one direction, and a packing-ring between said valve-cage and said piston.

7. An extensible arm for door-checks comprising two pairs of sections, each section being substantially of quadrant form in cross-section, the members of each pair being connected together, and the two pairs being releasably held with relation to each other.

GEORGE J. BLUM.

Witnesses:
L. L. MILLER,
GEORGE L. CHINDAHL.