L. C. NORTON.

DOOR CLOSER.

APPLICATION FILED MAR. 18, 1918.

1,345,504.

Patented July 6, 1920.

2 SHEETS—SHEET 1.

Fig. 1

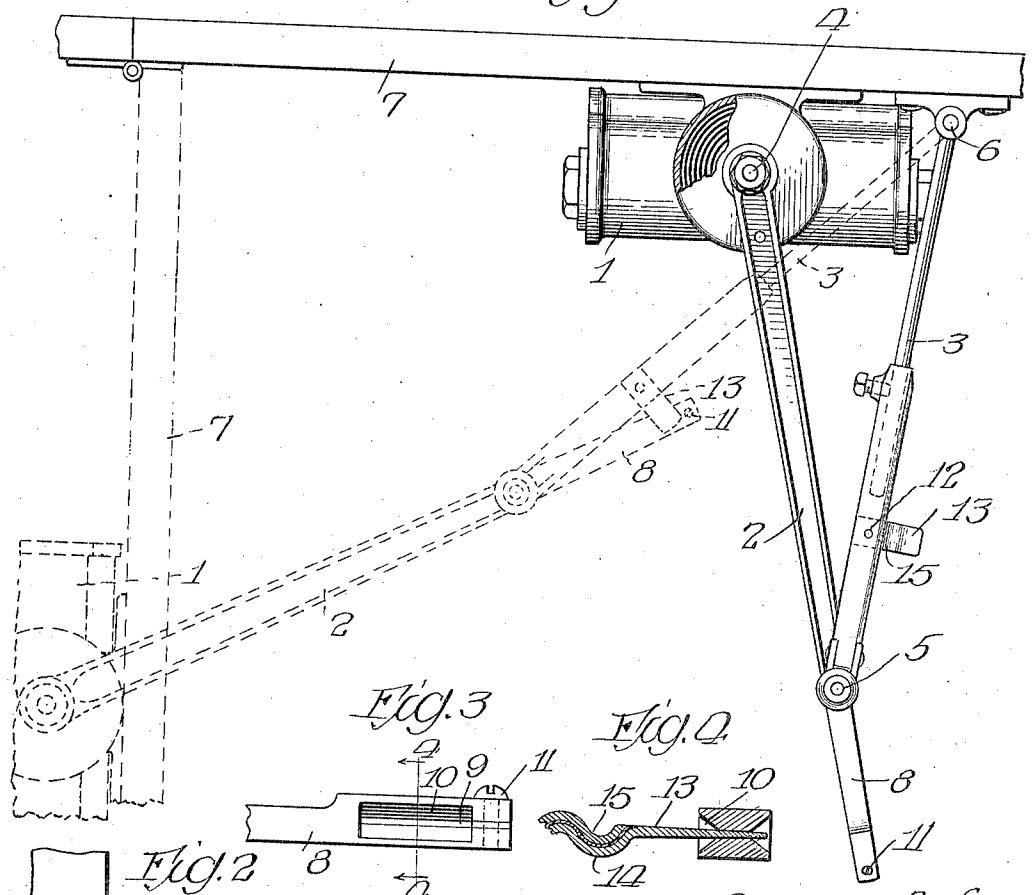


Fig. 3

Fig. 4

Fig. 2

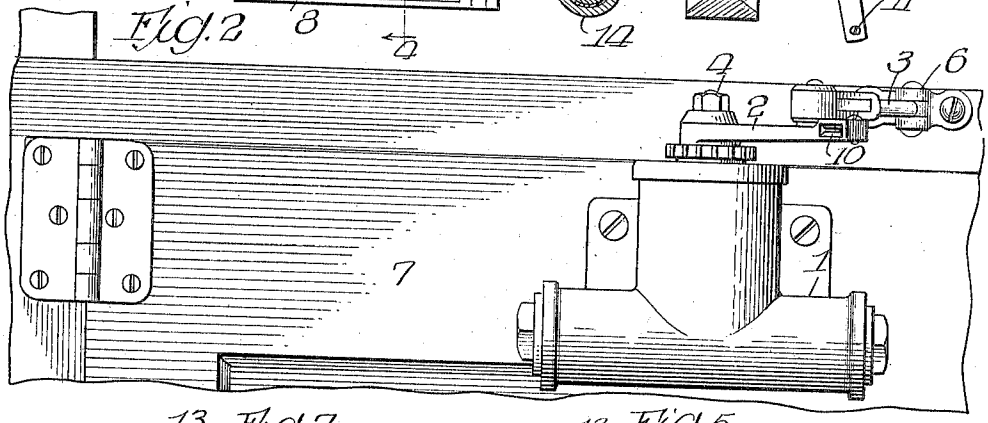


Fig. 7

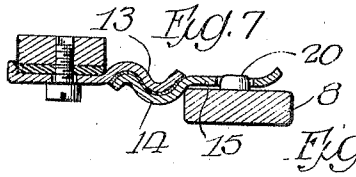


Fig. 5

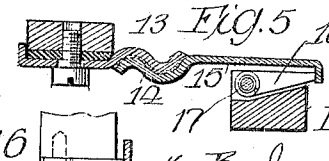
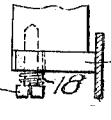


Fig. 6



Inventor

Lewis C. Norton

By James, Addington, Anderson & Seibold

Attys

L. C. NORTON.

DOOR CLOSER.

APPLICATION FILED MAR. 18, 1918.

1,345,504.

Patented July 6, 1920.

2 SHEETS—SHEET 2.

Fig. 8

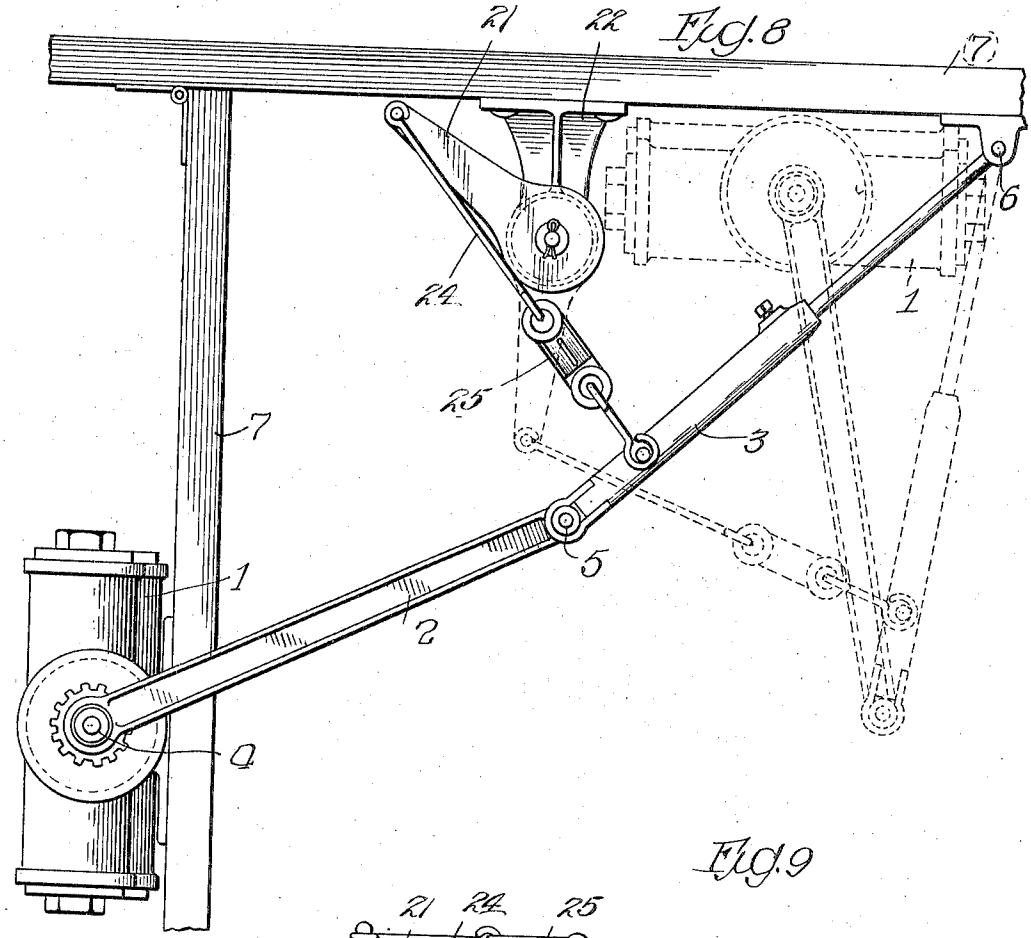


Fig. 9

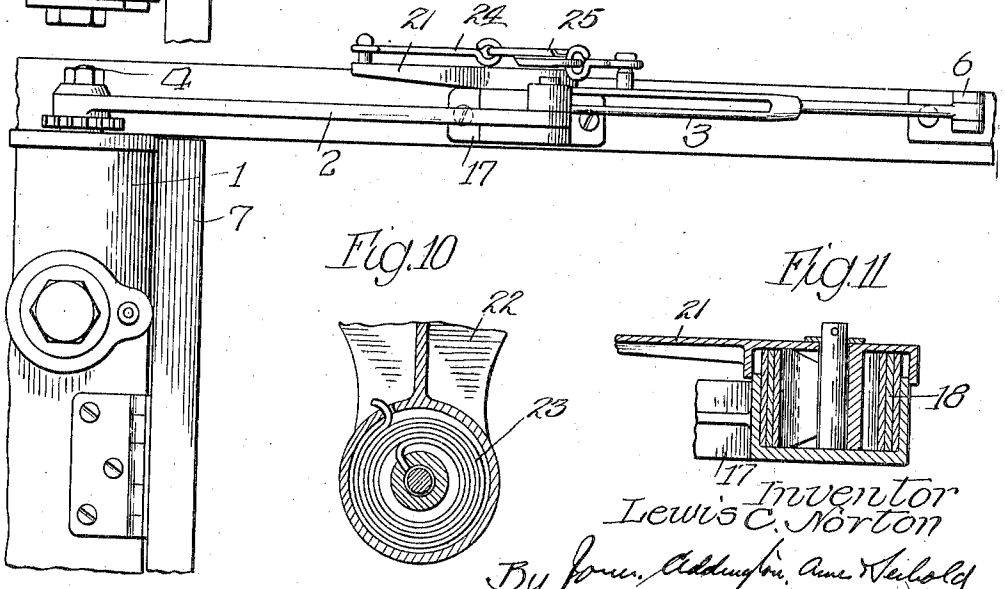


Fig. 10

Fig. 11

Inventor
Lewis C. Norton
By James, Addington, Anderson & Seibold
Attys.

UNITED STATES PATENT OFFICE.

LEWIS C. NORTON, OF CHICAGO, ILLINOIS.

DOOR-CLOSER.

1,345,504. Specification of Letters Patent. Patented July 6, 1920.

Application filed March 18, 1918. Serial No. 223,148.

To all whom it may concern:

Be it known that I, LEWIS C. NORTON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Door-Closers, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to improvements in door closers, and particularly to door closers for use in closing hinged fire doors, and the like.

One of the objects of my invention is to provide a door closer which is provided with means permitting a hinged door to remain open and which at the same time, in event of a fire, will automatically close the door.

For the purpose of disclosing my invention I have illustrated certain embodiments thereof in the accompanying drawings. In said drawings—

Figure 1 is a top plan view of a door closer embodying my invention;

Fig. 2 is a side elevation thereof;

Figs. 3 and 4 are detail sectional views showing particularly the catch used in connection with my closer;

Figs. 5 and 6 are sectional views showing a modification of the catch illustrated in Figs. 3 and 4;

Fig. 7 is a sectional view showing a still further modification thereof;

Fig. 8 is a plan view of a modification of my invention;

Fig. 9 is a side elevation thereof; and

Figs. 10 and 11 are detail sections showing the form of spring used in connection with the check and the supplementary arm.

In the embodiment illustrated in Figs. 1 to 4, I provide a door closer which comprises, in general, a cylinder 1, a spring-operated arm 2 and a lever 3. The spring-operated arm 2 is mounted upon a spring-rotated shaft 4, which shaft is connected by a suitable mechanism with a piston operating in the cylinder 1, the piston being so arranged that while it will permit the arm 2 to be rotated freely in a clockwise direction for a predetermined length of time, it will check the contiued movement of the arm to slow the same down, so that the door will not go shut with a bang. The check, comprising the cylinder and its spring-rotated arm 2, is preferably mounted on the door. At the outer end of the arm 2 an arm 3 is pivotally connected, as at 5, the opposite end of the arm 3 being pivotally connected, as at 6, with the door frame. The arm 3 is preferably made adjustable to provide for different positions on the frame. The device thus far shown is of such construction that when the door 7 is opened, the tendency of the spring surrounding the shaft 4 is to rotate the arm 2 in a clockwise direction, thereby closing the door. The arm 2 is provided with an extension 8 beyond the pivot 5, and this extension at its outer end has formed thereon a spring clamp, by bifurcating or splitting the end horizontally to form a socket 9. The edges of this socket are beveled, as at 10, to form a guide to the socket, and passing through the end of the arm, so that the size of this socket may be adjusted, is a screw 11. Mounted on the arm 3, being preferably secured to the under side by a screw 12, is a catch 13, the free end of which is slightly tapered and adapted to fit in the socket 9, when the door is open, to lock the arms 2 and 3 together, thereby preventing them from separating, so that the door will be held in open position as long as this catch is in operative position. The friction engagement of the catch 13 in the socket 9 is sufficient to hold the door open against the action of the spring in the door closer. On the other hand, a slight pull on the door will disengage this catch and permit the door to swing closed. This latch is of a peculiar construction, as shown in Fig. 3, and consists of a pair of links. One link of the latch is provided with a hooked end 14 which fits in a curved end 15 in the opposite link, the two links being secured together at this point by a suitable fusible metal, preferably a solder, and forming by this construction a continuous latch. In event of a fire, with the door held open by the latch, the fusible solder holding the two links of the latch together will melt, thereby permitting these two links to separate and releasing the door, so that it will swing shut under the influence of the door closer.

In Figs. 5 and 6 I have shown a modification of the catch illustrated in Figs. 1 to 4, inclusive. In this modification the extension 8 is provided with a dog 16, being pivotally held on the arm by means of the

screw 17. The free end of this dog is slightly above the pivotal point, so that the dog is slightly off center. The dog is held down by means of a coiled spring 18. The catch 13 is loosely held on the under side of the arm 3, instead of being rigidly held thereon, and its outer end is provided with a down-turned hook 19, adapted, when the door is swung to its full open position, to ride up over the dog 16 and engage the outer end of the dog and thereby hold the door open. Due to the fact that the dog is slightly off center, a pull on the door will rotate the dog 16 about its pivot, allowing the catch 19 eventually to disengage therefrom and permitting the door then to swing to, under the influence of the door closer. At the same time the dog, under the influence of the spring 18, will fly back to its normal position, ready to be engaged again by the catch 19 when it is desired to hold the door open.

In the structure illustrated in Fig. 7 I have illustrated still another modification of my fusible link catch. In this structure the upper side of the extension 8 is provided with a boss or pin 20, while the link 13 at its outer end is provided with an opening adapted, when the extension 8 is swung beneath the link, to engage over the pin 20 and hold the door open, the link 13 being loosely mounted on the under side of the arm 3, so that it will have a certain amount of vertical play at its free end. When it is desired to close the door, a slight push on the door in its open direction will cause the edge of the extension 8 to engage the under side of the hooked portion of the link, which, acting as a cam, will cause the end of the link to ride up, disengaging the opening from the pin 20. If the door is then released it will swing shut, under the influence of the spring of the door closer, before the opening in the link can again engage the pin 20 to lock the door open.

It is to be noted in respect to this manner of holding the door open that the latch 10 is held out when the door is held open in approximately the center of the doorway, where it will be in a position to be speedily affected by the heat of the fire.

In the structure shown in Figs. 8 to 11 I have illustrated another form of means for holding the two lever arms in their substantially alined positions. In this form I provide a spring-rotated lever arm 21 mounted upon a suitable arm 22, secured to the door frame. This lever arm 21 tends to rotate in a counterclockwise direction under the influence of a suitable coiled spring 23 mounted on the arm 22 within a suitable inclosing casing and having one end connected to the shaft on which the arm 21 is rigidly mounted and the other end secured to the arm 22. The end of this arm is connected by a connecting rod 24 to the arm 3 at a point near the pivotal connection 5. Interposed in the rod 24 is a fusible link 25 of substantially the same construction as the catch 13; that is, it consists of two sections suitably held together by a solder which melts at a predetermined temperature. The strength of the spring 23 is such that when the arms 2 and 3 are in substantial alinement, that is, when the door is opened 90 degrees, as shown in the drawing, the spring 23, due to the fact that the arms 2 and 3 are nearly on a dead center and the arms 24 and 21 are nearly on a dead center, has a greater pull than the spring in the door check, thereby holding the arms 2 and 3 in their alined position and preventing the door from closing. In event, however, it is desired to close the door, a slight pull on the part of the operator will reverse this unbalanced condition. As the arms 2 and 3 will be moved farther past the dead center, and in view of the fact that the spring of the door check is stronger than the spring 23, the spring of the door check will tend to close the door. As the door moves closed and the arm 2 moves past the point where it is extending at right angles to the door, the pull of the spring 23 will coincide with the pull of the spring of the door closer to assist in the further closing of the door. This assisting of the spring of the door check is decidedly advantageous in certain positions where there is a strong draft passing through the doorway, as the resistance to be overcome by the spring of the door check increases as the door closes, and the additional pull of the spring 18 aids the spring of the door check in overcoming this resistance.

When the door is open, in event of a fire the heat of the fire will melt the soldered connection of the two sections of the link 25, thereby disconnecting the arm 21 and the arm 3 and the door will move closed under the influence of the door closer. In this form of device as well as the form illustrated in Figs. 1 to 3 it will be seen that the fusible link is held out toward the center of the door, where it is in the path of the heat of the fire and readily fusible.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. The combination with a door closer, including a pair of arms pivotally connected together, one of which is pivotally connected to the door frame and the other of which is pivotally connected to the door, means tending to move said arms from substantial alinement when the door is open toward substantial parallelism to close the door, one of said arms extending beyond the pivotal connection, and a fusible latch connecting said extension with the other arm to hold

said arms in substantial alinement to prevent the door from closing.

2. The combination with a door closer comprising a pair of pivotally connected arms, one of which is pivotally connected to the door and the other of which is pivotally connected to the door frame, means tending to move said arms from substantial alinement to substantial parallelism to close the door, one of said arms having an extension beyond the pivotal connection between the two, a latch on the under side of one of said arms comprising a pair of links connected together by fusible material, a catch on the extension of the other arm adapted to be engaged by said latch when the door is moved to an open position, and a cam on the under side of said latch adapted to disengage the latch from said catch when the door is forcibly pushed further open.

3. The combination with a door closer comprising a pair of arms pivotally connected together, one of said arms being pivotally connected to the door and the other being pivotally connected to the door frame, and means tending to move said arms from substantial alinement to substantial parallelism to close the door, one of said arms having an extension thereof beyond the pivotal connection point, of a gravity latch on the other arm, a catch on said extension adapted to be engaged by said latch when the arms are moved to substantial alinement, said latch comprising a pair of links connected together by fusible material whereby when the temperature rises to a predetermined point the latch will separate and permit the arms to close the door.

In witness whereof, I have hereunto subscribed my name.

LEWIS C. NORTON.