L. C. NORTON.

DOOR CONTROLLING DEVICE.

APPLICATION FILED MAY 3, 1920.

1,358,977. **Patented Nov. 16, 1920.**

Fig. 1.

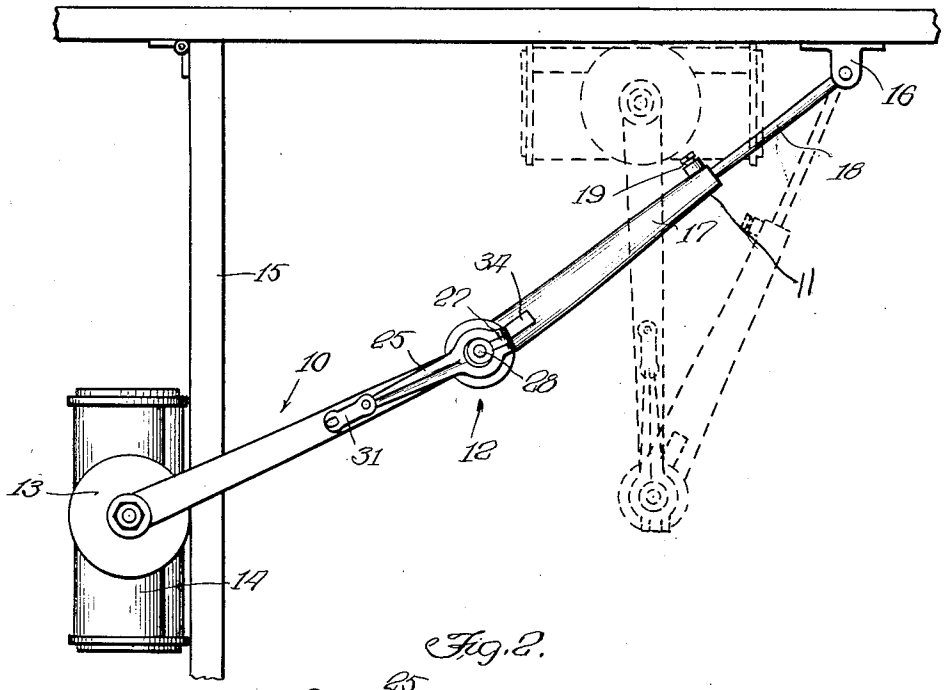


Fig. 2.

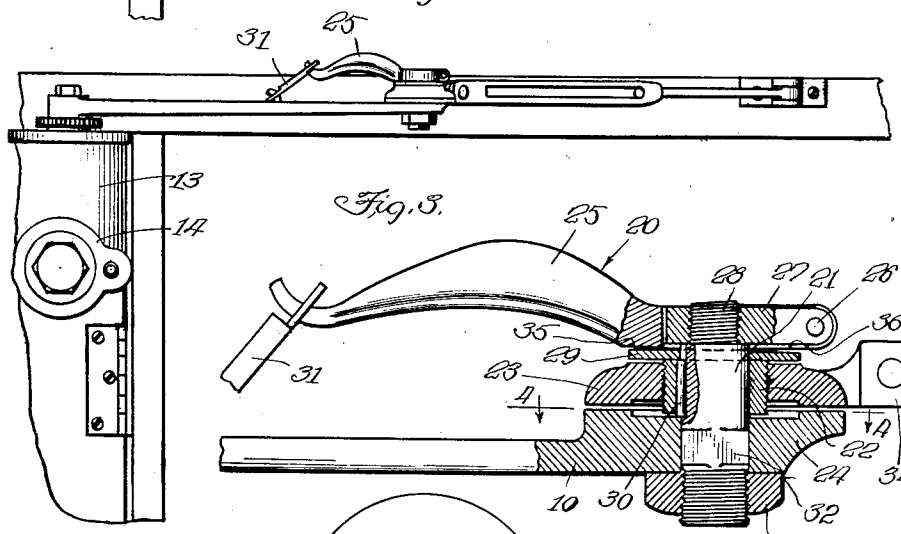
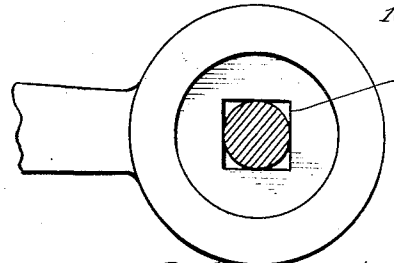


Fig. 3.

Fig. 4.



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By Jones, Addington, Ames & Seibold Attys.

UNITED STATES PATENT OFFICE.

LEWIS C. NORTON, OF CHICAGO, ILLINOIS, ASSIGNOR TO NORTON DOOR CHECK COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

DOOR-CONTROLLING DEVICE.

1,358,977. Specification of Letters Patent. Patented Nov. 16, 1920.

Application filed May 3, 1920. Serial No. 378,482.

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-Controlling Devices, 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 door controlling devices, and more specifically to door controlling devices having means for closing the door, means whereby the door may be held open, and means whereby in case of fire, the door holding means will be released to allow the door to close.

One of the objects of my invention is to provide improved means whereby a door closing device having a screw-threaded connection between two arms, which causes the two arms to bind together to hold the door in open position, may be provided with means whereby in case of fire the arms will be free from the binding engagement to allow the door to be swung to the closed position under the action of the door closing mechanism.

A further object of my invention is to provide an improved door closing device, which will be efficient and reliable and durable in operation, simple in construction, and cheap to manufacture.

Further objects will appear from the detailed description to follow and from the appended claims.

In the drawings in which one embodiment of my invention is shown:

Figure 1 is a plan view of a door controlling device showing its position on the door, and showing in dotted lines the position the mechanism occupies when the door is closed;

Fig. 2 is a side elevation of the part shown in Fig. 1;

Fig. 3 is a section through the joint or connection of the two arms; and

Fig. 4 is a section on the line 4—4 of Fig. 3.

In order to give a general idea of the construction as shown in the drawings, it is here stated that it comprises two arms 10 and 11, respectively, having a pivoted and a screw-threaded connection with each other at 12, a spring drum 13, for exerting a force on the arm 10, and a dash-pot mechanism 14, for controlling the movement of the arm 10. The spring drum 13 and dash-pot mechanism 14 are constructed as a unit, which unit may be mounted on the door 15. The arm 11 may be pivotally connected to the door frame by means of a bracket 16. This arm 11 may be made in two telescoping sections 17 and 18 respectively, whereby the arms are adjustable in length, the two parts being held in adjusted position by means of a set screw 19.

In order that the door may be held in open position, when desired, a screw-threaded connection is provided between the arms 10 and 11, which tightens up when the door is swung to the full line position shown in Fig. 1, so that the two arms 10 and 11 bind with respect to each other to hold the door in open position. A heat-released mechanism 20 is provided, which in the case of fire, will cause the screw-threaded connection between the arms to be slackened up, to release the arms from their binding relation, to allow the door to close under the action of the spring drum 13.

Referring now to the drawing in detail, and first particularly to the construction shown in Fig. 3, which shows the detail of the connection between the two arms, the arm 10 has secured thereto a stud 21, on which is feathered an externally-threaded member 22, with which the hub-like portion 23 of the arm 11 has a threaded engagement. It will be seen that if the externally threaded sleeve 22 is held from sliding movement on the stud 21, and is also held from turning movement with respect to the stud 21, that a relative movement between the arms 10 and 11 will cause the hub portion 23 of the arm 11 to approach or recede with respect to the hub portion 24 of the arm 10 depending on the direction of the relative movement between the arms. The threads on the sleeve 22 are cut so that moving the door to open position will cause the hub portions 23 and 24 to approach each other, and the parts are so proportioned that the adjacent faces of the hub portions 23 and 24 will come into binding engagement with each other when the door reaches its full open position as shown in Fig. 1. This binding action between the faces of the hub portions 23 and 24 is enough to hold the door in its open position against the action of the spring drum 13.

As intimated above, it is necessary in order to have this binding engagement between the faces of the hub portions 23 and 24, that the externally-threaded sleeve 22 shall be held against longitudinal movement on the stud 21. Means are therefore provided to hold this sleeve 22 against sliding upwardly on the stud 21, the means shown comprising a lever 25, pivotally mounted at 26 on a fulcrum block 27, this fulcrum block being threaded at 28 to the stud 21. A bearing washer 29 may be interposed between the lever 25 and the upper end of the externally threaded sleeve 22. In order to keep the externally threaded sleeve 22 from turning on the stud 21, a cover 30 is provided, which will prevent turning of the threaded sleeve on the stud, but which will permit the threaded sleeve to slide upwardly if, and when the lever 25 is released.

In order to normally hold the lever 25 in position to hold the sleeve 22 against sliding movement, a fusible link 31 is provided which will fuse in case of fire, and release the lever 25. When the link 31 is fused, the lever 25 will no longer serve to hold the sleeve 22 against sliding movement on the stud 21, so that this sleeve 22 can no longer hold the faces of the hub portions 23 and 24 in binding engagement. When the hub portions 23 and 24 are released from the binding engagement, the arm 10 is free to move under the action of the spring drum 13, which swings the door to closed position. In order that the stud 21 may be prevented from turning in the hub portion 24 of the arm 10, it is provided with a squared portion 32 which engages a squared opening in the hub portion 24. A nut 33 is provided to hold the stud against endwise movement outwardly in the hub portion 24.

In order to allow some latitude for adjustment, a pivotal connection is provided at 34 between the hub portion 23 and the rest of the arm 11, so that the arm 11 has a slight up and down adjustment to facilitate the installation of the device. In order that the door may be brought to a stop in any desired open position, the nut 33 can be adjusted on the stud 21 to move the fulcrum member 27 toward or from the face of the hub portion 24. The distance of the fulcrum member 27 from the face of the hub portion 24 determines the position at which the faces of the hub portions 23 and 24 will come into binding engagement and hence determine the open position of the door.

The construction is such that the fusible link 31 will be located in a position where it will be exposed to the action of the heat in case of fire, so that it will be sure to fuse.

The operation of the device has been outlined in connection with the description of the construction but is in brief as follows: Assuming that the door is closed, and it is desired that it be swung open and held open, the door 15 is pushed open, causing the arms 10 and 11 to straighten out with respect to each other, causing the hub portion 23 to be threaded downwardly on the threaded sleeve 22 to force the lower face of the hub 23 into binding engagement with the upper face of the hub 24. These faces are moved into binding engagement at just about the time this door is moved to its fully open position, and this binding engagement is sufficient to hold the door open against the action of the spring drum 13. In order to insure that the lever 25 will bear on the washer 29 (and hence on the threaded sleeve 22) at a certain definite place, a construction is provided which insures substantially line contact between the lever 25 and the washer 29. This line contact is accomplished by sloping the lower face of the lever 25 which is adjacent the upper face of the washer 29 in both directions from a diameter of the washer as indicated at 35 and 36, which shows portions of the lower face of the lever 25 slightly spaced from the upper face of the washer 29, while a portion of the lever 25 between the portions 36 and 37 engages with a line contact the upper face of the washer 29. This substantially line contact prevents a shifting of the bearing point or line between the washer 29 and the lever 25 and insures that the pressure will be exerted evenly on the washer and hence on the sliding sleeve 22 and will not be exerted to one side or the other.

In case of a fire, the link 21 will fuse and come apart in the middle, releasing the lever 24. The lever 25 thus no longer forms a backing or support for the externally threaded sleeve 22. As soon as the faces of the hub portions 23 and 24 are free from binding engagement, the door 15 will be swung to its closed position under the action of the spring drum 13.

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

1. A door closing device provided with means whereby the door may be held in open position, and whereby the door may be released to close in case of fire, said device comprising two arms pivotally connected together, and having a screw threaded connection which tightens up when the door is opened, to hold the door in open position.

2. A door controlling device having means for closing the door, means whereby the door may be held in open position, and means whereby the means for holding the door open will be released in case of fire, said controlling device comprising two pivotally connected arms, having a screw threaded connection with each other which tightens up when the door is opened to hold the door in open position, and heat controlled means for

causing said screw threaded connection to be loosened.

3. A door controlling device having means for closing the door, means whereby the door may be held in open position, and means whereby the means for holding the door open will be released in case of fire, said controlling device comprising two pivotally connected arms having a screw threaded connection with each other, which tightens up when the door is opened to hold the door in open position, said screw threaded connection comprising a movable screw threaded member and heat controlled means for normally holding said movable screw threaded member against movement.

4. A door controlling device having means for closing the door, means whereby the door may be held in open position, and means whereby the means for holding the door open will be released in case of fire, said controlling device comprising two pivotally connected arms having a screw threaded connection with each other, which tightens up when the door is opened to hold the door in open position, said screw threaded connection comprising a movable screw threaded member and heat controlled means for normally holding said movable screw threaded member against movement, said heat controlled means comprising a movable support.

5. A door controlling device having means for closing the door, means whereby the door may be held in open position, and means whereby the means for holding the door open will be released in case of fire, said controlling device comprising two pivotally connected arms having a screw threaded connection with each other, which tightens up when the door is opened to hold the door in open position, said screw threaded connection comprising a movable screw threaded member and heat controlled means for normally holding said movable screw threaded member against movement, said heat controlled means comprising a lever.

6. A door controlling device having means for closing the door, means whereby the door may be held in open position, and means whereby the means for holding the door open will be released in case of fire, said controlling device comprising two pivotally connected arms having a screw threaded connection with each other, which tightens up when the door is opened to hold the door in open position, said screw threaded connection comprising a movable screw threaded member and heat controlled means for normally holding said movable screw threaded member against movement, said heat controlled means comprising a lever and a fusible link.

7. A door controlling device having means for closing the door, means whereby the door may be held in open position, and means whereby the means for holding the door open will be released in case of fire, said controlling device comprising two pivotally connected arms having a screw threaded connection with each other which tightens up when the door is opened to hold the door in open position, said screw threaded connection comprising a movable screw threaded member and a pin, said screw threaded member being slidable on said pin.

8. A door controlling device having means for closing the door, means whereby the door may be held in open position, and means whereby the means for holding the door open will be released in case of fire, said controlling device comprising two pivotally connected arms having a screw threaded connection with each other which tightens up when the door is opened to hold the door in open position, said screw threaded connection comprising a movable screw threaded member and a pin, said screw threaded member being slidable on said pin, and one of said arms having a portion screw threaded on the screw threaded member.

9. A door controlling device having means for closing the door, means whereby the door may be held in open position, and means whereby the means for holding the door open will be released in case of fire, said controlling device comprising two pivotally connected arms having a screw threaded connection with each other which tightens up when the door is opened to hold the door in open position, said screw threaded connection comprising a movable screw threaded member and a pin, said screw threaded member being slidable on said pin, and a fulcrum supported on said pin having a lever for supporting said screw threaded member.

In witness whereof I have hereunto subscribed my name.

LEWIS. C. NORTON.