Sept. 11, 1923. 1,467,826

C. R. BUMBARGER

FIRE DOOR BINDER

Filed Oct. 16, 1922 2 Sheets-Sheet 1

Fig. 1.

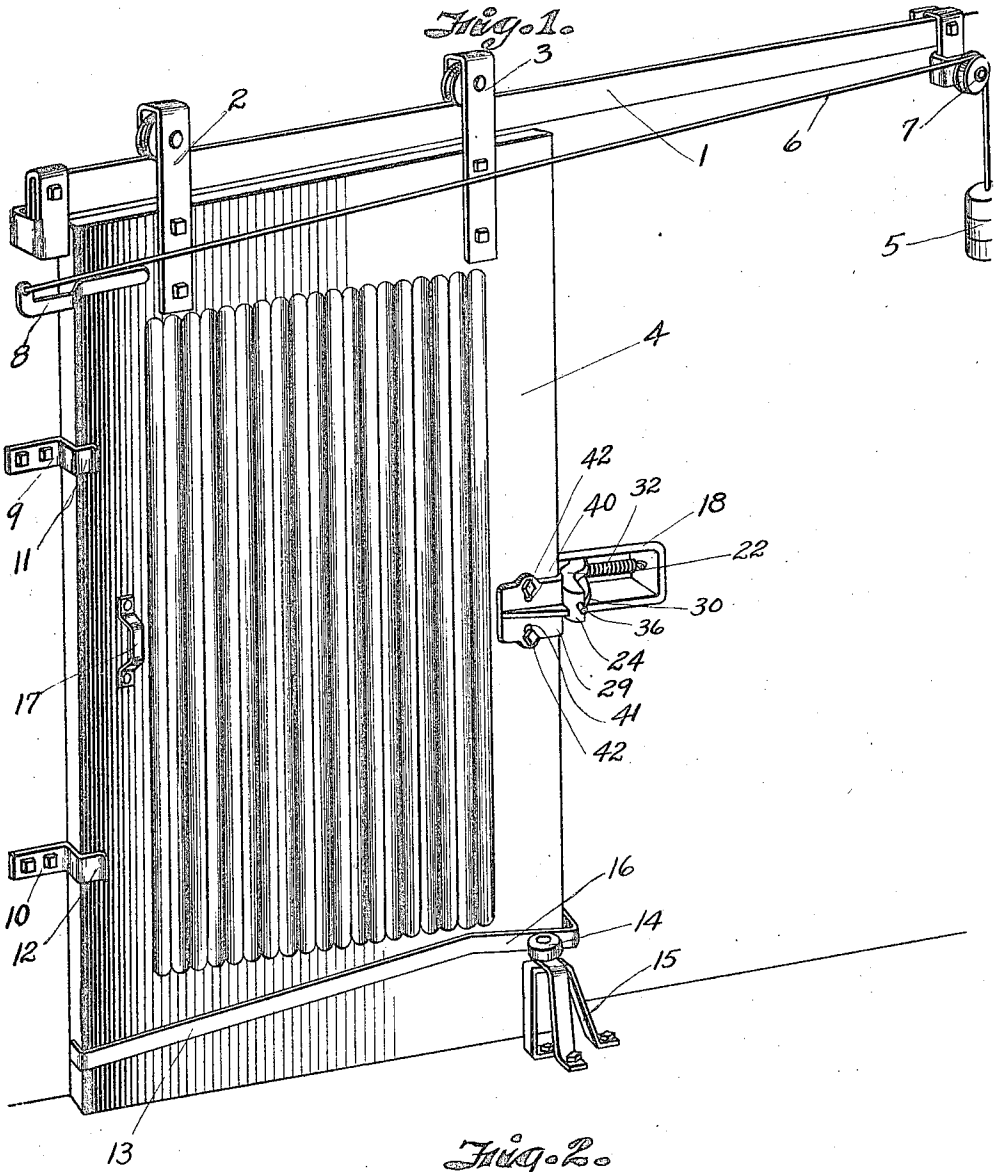
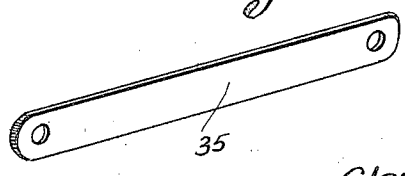


Fig. 2.



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Fig. 3.

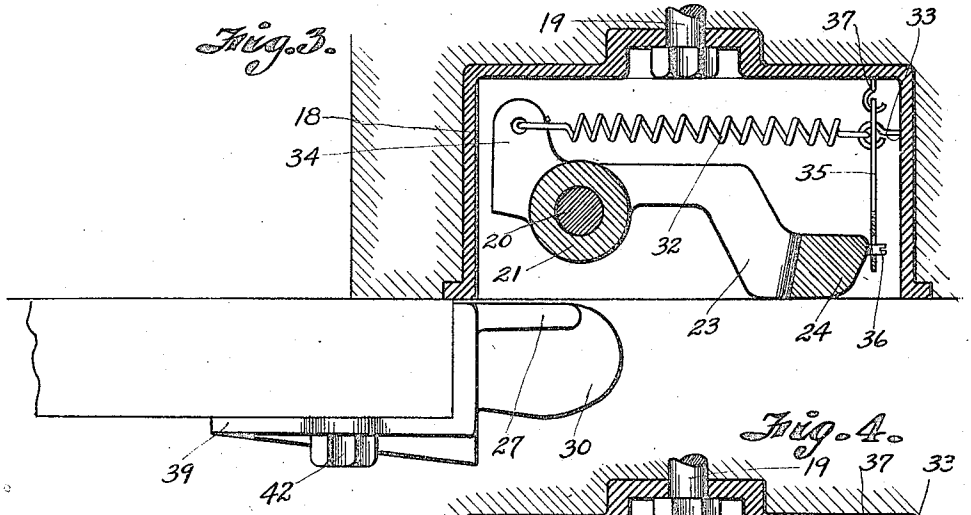


Fig. 4.

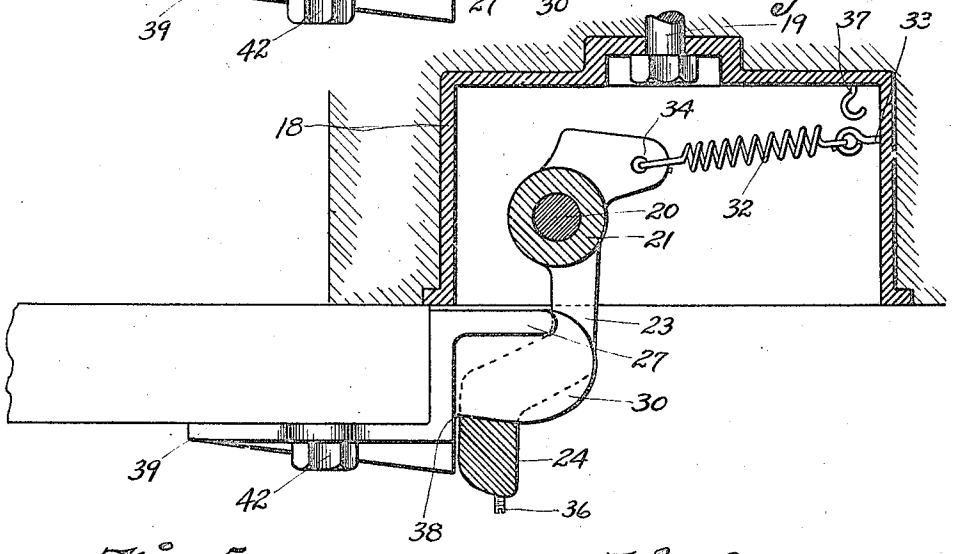


Fig. 5.

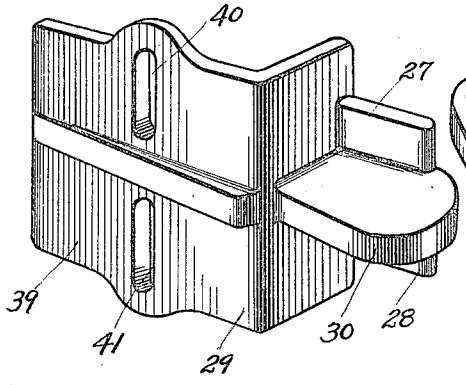
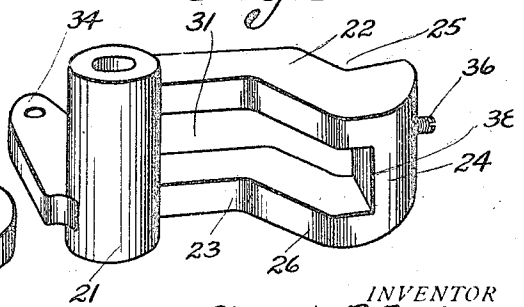


Fig. 6.



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UNITED STATES PATENT OFFICE.

CLARENCE R. BUMBARGER, OF KANSAS CITY, MISSOURI, ASSIGNOR TO GEORGE W. JOHNSON MANUFACTURING COMPANY, OF KANSAS CITY, MISSOURI, A CORPORATION OF MISSOURI.

FIRE-DOOR BINDER.

Application filed October 16, 1922. Serial No. 595,015.

To all whom it may concern:

Be it known that I, CLARENCE R. BUMBARGER, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Fire-Door Binders; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to fire doors for buildings, and the primary object of the invention is to provide means for preventing warping of the door during fires.

The invention is designed particularly for use in connection with sliding fire doors. Such doors usually have their front edges abutting against cleats when they are closing the door opening and such cleats have overlapping fingers or ends which prevent the front edge of the door from bulging away from the wall even under high temperatures. The rear edges of such doors, however, are unsupported and particularly at the middle portion between the top and bottom edges of the door and are liable to bulge away from the wall so as to allow the fire to lap past the door openings. Therefore, the fire doors are not quite as efficient as they would be provided the rear edges of the doors were bound against warping as efficiently as the front edges.

My invention contemplates means which will cause the rear edge of the door at the transverse center or thereabout to be efficiently bound against warping under high temperature, and I, therefore, designate the device a fire door binder, although it is normally inoperative and, as shown, consists of a latch which may swing into operative position upon the fusing of the link when the temperature adjacent to the door is high enough to become dangerous.

The novel features of the invention, as well as the method of operation, will be clearly understood by reference to the following description in connection with the accompanying drawings, in which:

Fig. 1 is a perspective view of a fire door in closed position showing my invention applied.

Fig. 2 is a detail perspective view of one form of fusible link.

Fig. 3 is a transverse sectional view through the brace in its inoperative or retracted position.

Fig. 4 is a like view showing the binder in its applied position.

Fig. 5 is a detail perspective view of the tongue member of the binder, and

Fig. 6 is a similar view of the hasp for engaging the tongue.

Referring now to the drawings by numerals of reference:

1 designates a supporting rail upon which the door hangers 2 and 3 travel. The door hangers support a fire door 4 of appropriate construction, the door being hung in the usual way, and there is a counter balance weight 5 having a flexible connection 6 which passes over a pulley 7, and has one end fastened to the bracket 8 carried by the door. The rail 1 is preferably inclined so that the door will have a normal tendency to move into closing position, the movement being limited by the cleats 9 and 10, having over-lapping ends 11 and 12 which brace the front edge of the door against bulging under high temperatures. The lower end of the door is provided with a rail 13, bearing against a roller 14 on a floor bracket 15, the rail having a cam or offset portion 16 which travels against the roller so that the lower end of the door will be held against the wall. The door is also provided with a handle 17 by means of which the door can be opened,—the weight 5 being a counter balance so the door may slide back and forth easily.

The construction thus far described is not new, and, while it provides an efficient fire door, it does not wholly meet the requirements because the rear edge of the door about a zone adjacent to the transverse center will have a tendency to warp away from the walls during fires, and it is this objection which I wish to overcome with my invention.

The invention per se is shown in Figures 3, 4, 5 and 6, and it consists of a socket or box 18 embedded in the wall adjacent to the rear edge of the door and preferably

secured in place by a bolt 19. There is a vertical pin 20, supported by the top and rear walls of the box 18, and mounted thereon is a hollow rock shaft 21 which carries a hasp comprising two side bars 22 and 23 spaced apart, having their outer ends connected by a cross bar 24. The side bars 22 and 23 have offset portions 25 and 26, the front edges of which are inclined to constitute cam portions against which may ride the oppositely disposed lugs 27 and 28 on the door bracket 29. The door bracket—that is, the bracket carried by the door—carries a tongue 30, the width of which is less than that of the slot 31, formed by the spaced bars 22 and 23, the tongue being between the lugs 26 and 27 and in a horizontal plane so that when the hasp is thrown into functional position, the tongue will be received within the slot. The hasp is normally urged into tongue-engaging position by a spring 32 which has one end anchored to the box as at 33, and the other end fastened to a projection or crank 34 rigid with the rock shaft 21. The hasp, however, is held against movement into functional position by a fusible link 35, one end of which is provided with a perforation through which the pin 36 on the end of the hasp projects, and the other end of which is provided with a similar perforation engaging an anchor hook 37, carried by the floor of the box or socket 18. Normally, the hasp will be in the position shown in Fig. 3, held out of functional position by the link. Therefore, the door may be moved back and forth without affecting the binder. If the flames become hot enough, however, to fuse the link 35, it being understood that the link may be of any appropriate fusible material, then the spring 32 exerts its tension to swing the hasp into engagement with the tongue. The cam offset portions 25 and 26 lie against the lugs 27 and 28. The inner face 38 of the cross bar 34 will lie against the outer edge of the tongue 30 so that even if the door becomes very hot, it will not warp at the middle, which is the point at which it does usually warp. The hasp will not prevent the door from being legitimately opened, however, because if the firemen desire to slide the door back to uncover the door opening, this may be accomplished in the usual way by pushing sidewise on the door as for example, through the medium of the handle 17. The curved outer edges of the lugs 27 and 28 will ride on the cam portions of the offsets 25 and 26 so that the hasp will be swung back into the box or recess 18 as the door moves sidewise. Therefore, the door can be readily opened. Just as soon as the door is closed however, the spring 32 will again exert its tension to throw the hasp back into the position shown in Fig. 4. The door can only be opened manually, but it will always close automatically because its weight will be in excess of the counter balance weight. The bracket 29 may consist of a plate L-shaped in cross section, and its wing 39 may have transverse elongated slots 40 and 41 through which bolts 42 may pass, the elongated slots permitting vertical adjustment of the bracket 39, so that the tongue 30 will register with the slot 31, and be in position to pass between the bars 22 and 23 when the hasp is thrown into functional position upon the fusing of the link 35.

It will be apparent from the foregoing that the brace can be applied to existing fire doors without materially changing their construction, and that it will serve as an efficient binding means to prevent warping of the rear edge of the door—that is, prevent the transverse middle portions of the door from warping even under high temperatures. This, I consider an important advance in the fire door art because it will overcome objections advanced by the underwriters to sliding doors, the objection being that they are liable to warp under high temperatures.

What I claim and desire to secure by Letters-Patent is:

1. A binder for fire doors comprising a bracket for attachment to the fire door, a tongue on the bracket, a complementary member to be normally confined within a recess in the wall adjacent to the door and having means tending to urge it into engagement with the tongue, and a fusible means for holding the member within the recess until the fusible means is fused by a rise in temperature.

2. A binder for fire doors to prevent the fire door from warping, said brace comprising two members, one of which is for attachment to the door, and the other is for attachment to a support adjacent to the door, the second member being normally inoperative, and means for rendering the second member operative to engage the first to connect it to the wall upon the fusing of a part associated with the second member.

3. In a device of the class described, the combination with a bracket for attachment to the door, a spring-urged locking device for engagement with a part on the bracket, means for attaching the spring-urged member to the wall, and means for holding the spring-urged member retracted to a non-functional position, the last named means comprising a fusible member which becomes effective by fusing.

4. A device of the class described comprising two members, means for attaching one member to a fire door and means for attaching the other member to a recess in the

wall adjacent to a fire door, a fusible means for normally holding the second member retracted within the recess, and means for normally urging the second member into engagement with the first.

5. A device of the class described comprising two members, one of which is provided with the tongue and the other with a hasp, means for attaching the tongue to a fire door, means for pivotally securing the hasp within a recess in the wall adjacent to the fire door, means for normally urging the hasp toward the tongue so that the tongue can be engaged thereby, and a fusible member normally holding the hasp in a retracted position within the recess.

In testimony whereof I affix my signature.

CLARENCE R. BUMBARGER.