Jan. 31, 1956 S. E. NEWTON 2,732,920

FUSIBLE MOTION ARRESTOR

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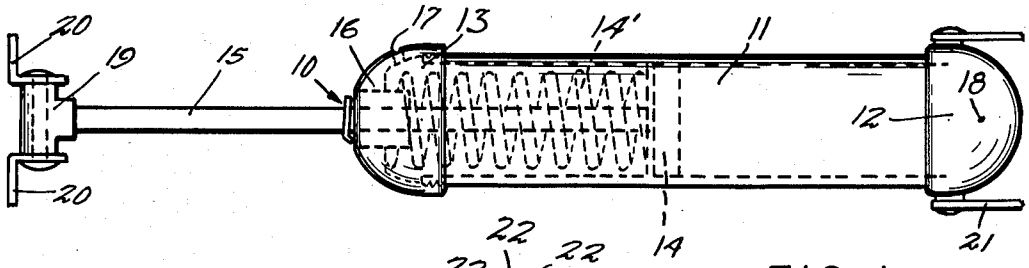


FIG-1

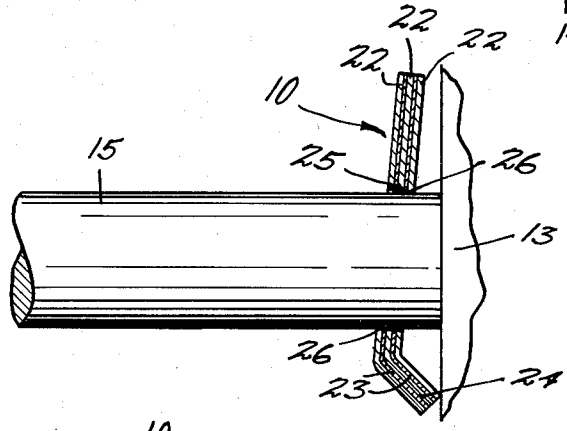


FIG-2

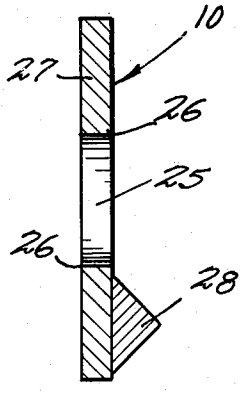


FIG-3

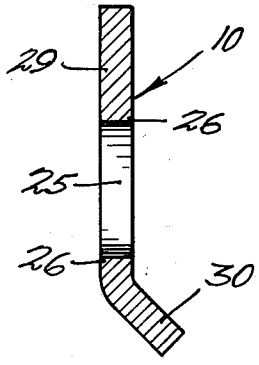


FIG-4

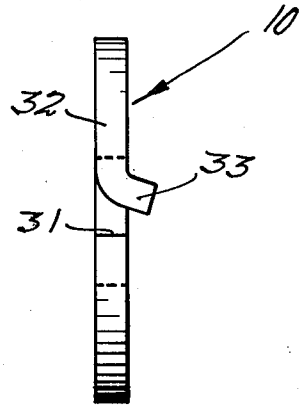


FIG-5

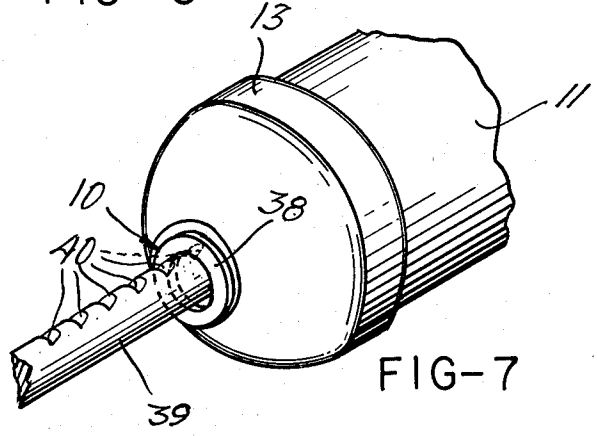


FIG-7

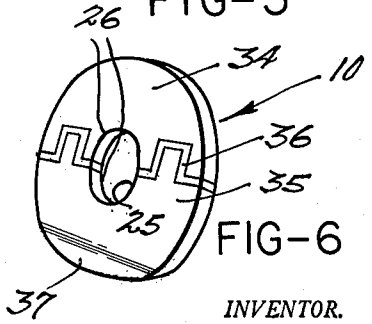


FIG-6

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FUSIBLE MOTION ARRESTOR

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7 Claims. (Cl. 189—45)

This invention relates to heat sensitive devices and more particularly to a fusible motion arrestor.

One object of the invention is to provide a fusible motion arrestor which is adapted to be employed with a closure operating device to arrest the movement of the device and defer movement of the closure to a closed position until a temperature capable of fusing the arrestor is present.

Another object of the invention lies in the provision of a fusible motion arrestor having a flat body provided with an opening adapted to encircle the reciprocating rod of a closing device in a barely loose fit and the body having a distortion disposed to tilt the arrestor and effect binding of the rod; the distortion being maintained by fusible material.

Another object of the invention lies in the provision of a closure operating device of the cylinder type having a piston reciprocably carried therein and carrying a piston rod extending outwardly through a head of the cylinder and a fusible motion arrestor disposed intermediate the piston rod and said head whereby movement of the rod is deferred until the arrestor is fused.

Another object of the invention lies in the provision of a fusible motion arrestor having a body formed of a number of pliant rings formed into a rigid unit by means of a fusible binder.

Another object of the invention is to generally improve closure operating devices which are adapted to move closures to a closed position when a fire breaks out in a building and the temperature reaches a predetermined degree.

Another object of the invention is to provide a fusible motion arrestor which is inexpensive to manufacture and which is positive in its release of a reciprocating rod when a predetermined fusing temperature is reached.

These and other objects of the invention will become apparent during the course of the following description.

In many municipalities it is becoming law that in buildings for invalids, such as hospitals and sanitariums, within certain distances from the fire escapes must be sealed shut or suitable fire actuated closure be provided to insure its closing in the event a fire breaks out in the building. Of course the access openings to the fire escape must always be usable and therefore it is required that a suitable closure operating device be associated with fire escape access openings.

In most instances it is desirable that openings at, or adjacent to fire escapes be in a position to be opened for purposes of ventilation and because of the expensive apparatus now on the market for this purpose, the present invention has been devised, making it possible to install automatic closure operating devices at a minimum cost.

In the accompanying drawings forming a part of this specification, and in which like numerals are employed to designate like parts;

Figure 1 is a plan view of a closure operating device having a fusible motion arrestor associated therewith and securing the piston rod in the extended position;

Figure 2 is an enlarged fragmentary view showing a portion of the piston rod and its associated head and a fusible motion arrestor in cross-section;

Figure 3 is a vertical cross section of a modified type of motion arrestor;

Figure 4 is a vertical cross section of a still further modification in the fusible motion arrestor;

Figure 5 is a side elevation of a fusible motion arrestor showing a still further modification;

Figure 6 is a view in perspective showing another modified form of fusible motion arrestor; and

Figure 7 is a view in perspective showing a portion of the piston rod, cylinder, and associated head in which another modification employing the principles of this invention is shown.

Broadly speaking, the essence of this invention lies in the fusible motion arrestor indicated in general by the numeral **10** and this may take one of a number of forms as indicated by the modifications exemplified in the drawings.

I am well aware of the fact that prior to my invention fusible materials have been employed in forming links for releasing sliding doors when heated to a predetermined fusion temperature and also for actuating relatively expensive door checks of the liquid containing type. It is, however, my purpose to provide a door check or closure operating device which is relatively inexpensive and which makes it practical in the application to buildings having a large number of openings near fire escapes.

The closure operating device which I have found to be most practical for this application is illustrated in Figures 1 and 7 as having a cylinder **11** provided with heads **12** and **13** at opposed ends. A piston **14** is disposed within the cylinder and reciprocable therein. The piston is provided with a piston rod **15** which extends outwardly through the head **13** and is reciprocably mounted in a bearing **16** carried by the head **13**. An expansion spring **17** is interposed the head **13** and the piston **14** urges the piston toward the rear head **12** wherein the piston rod **15** is telescoped within the cylinder **11**.

Inspection of Figure 1 will show that the head **13** is provided with an enlarged vent **17** which permits escape of air in advance of the piston **14** as the closure is opened drawing the piston rod **15** out of the cylinder and moving the piston **14** forwardly. A restricted vent **18** is provided in the rear head **12** and limits the telescopic movement of the piston rod **15** to a constant speed commensurate with the escape of air confined between the piston **14** and the head **12**.

The outer end of the piston rod **15** is provided with a T-fitting **19** which is pivotally secured to brackets **20** adapted to be fastened to a door, hinged window, or other closure and the head **12** is provided with a bracket **21** adapted to be secured to a fixed element relative to the closure to enable the closing device to shift the closure to a closed position.

The fusible motion arrestor **10** is shown in Figure 2 as comprising a number of pliant, flat rings **22** which in themselves do not have the body strength required to prevent their being distorted by even slight pressures and these rings **22** are formed into a rigid unit by means of a fusible binder **23** disposed intermediate each ring, and soldering the rings one to another. I have shown three pliant rings **22**, however, it will be understood that any number of rings found necessary will be used to provide a rigid, unitary arrestor having the body strength required to lock the piston rod **15** against telescopic movement with the cylinder **11**. Inspection of Figure 2 will show that a marginal edge portion of the arrestor is bent at an angle from the plane of the body forming a distortion or lip **24** which is presented toward the head **13** of the closing device.

A central opening **25** is formed in the body of the arrestor **10** and is circular to coincide with the peripheral

shape of the piston rod **15**. It will be noted that the size of the opening is such as to provide a barely loose fit about the piston rod **15**. I use the phrase, "barely loose fit," to indicate that the arrestor is loosely mounted upon the piston rod for movement axially thereon and yet is small enough that when the arrestor is tilted out of a plane at right angles to the axis of the piston rod **15**, the sharp edges **26** will frictionally engage the piston rod and prevent its movement longitudinally through the arrestor.

In Figure 3 I have shown a motion arrestor having a body of any material desired, such as steel, and soldered thereon I have provided a distortion or boss **28** which is secured to a plane face of the arrestor body and is disposed in axial parallel relation to the opening **25**.

In Figure 4 I have shown the motion arrestor as being formed completely from a fusible metal and having a flat ring shaped body **29** provided with a distortion or lip **30** disposed out of the plane of the body.

In Figure 5 I have shown that the motion arrestor may have a radially extending cut **31** in the body **32** similar to that of a common lock washer and one end of the body adjacent the cut may be bent or distorted to form a lip **33** out of the plane of the body **32**.

In Figure 6 I have shown the motion arrestor as taking the form of a flat ring comprising two substantially semi-circular sections **34** and **35** fused together by means of fusionable material at **36** to maintain the distortion or lip **37** at a constant position relative to the body.

Reference to Figure 7 will show that the motion arrestor may take another form, not having the distortion and as such the arrestor may take the form of a **U** or be circular as indicated at **38** of Figure 7. In this form the piston rod **39** is provided with one or more recesses **40** in which the motion arrestor **38** will fit and lock the piston rod **39** against telescopic movement into the cylinder **11**. When a predetermined temperature is reached and the motion arrestor **38** fuses or melts, the piston rod **39** is released to move into the cylinder thus closing the closure.

The fusible material adaptable for use in connection with this invention may be one of the many common alloys presently used for fusible links and the temperature at which the arrestor will fuse may be varied by increasing or decreasing the ratio of metals in the alloy. This is common knowledge among those skilled in this particular art and will not be dealt with in detail here. It is, however, feasible that plastics and other materials not yet discovered may be found practical in this use and therefore, it is not my intention to limit my invention to any particular fusible material; but I desire to protect the invention as broadly as possible for every use of which it is susceptible, with all materials which are found to possess the physical qualifications necessary, limited only by the appended claims and in view of the prior art.

Having thus described my invention, I claim:

1. In a closure operating device having a reciprocable rod biased to move a closure to the closed position during telescopic movement into a second element of the device, means for deferring said telescopic movement until a predetermined temperature is present comprising a flat ring having a central bore encircling said rod in a barely loose fit; said ring having a distortion maintained by material fusible at said predetermined temperature and disposed to bear against said second element and effect frictional binding of the rod in said bore until said fusing action.

2. As an article of manufacture, a fusible motion arrester for controlling the biased movement of a reciprocating rod of a closing device comprising a flat body having an opening encircling said reciprocating rod of a closing device in a barely loose fit; and said body having a distortion maintained by material fusible at a predetermined temperature and disposed out of the plane of the body sufficiently to tilt the arrestor to effect the binding of the rod in the opening when the distortion bears against the fixed surface relative to the rod.

3. The invention as defined in claim 2 wherein the opening is provided with sharp edges for frictionally engaging the peripheral face of the rod and binding the rod against longitudinal movement therethrough.

4. The invention as defined in claim 2 wherein the distortion is a mass of fusible material fixed to a plane face of said body and disposed axially parallel with said opening.

5. The invention as defined in claim 2 wherein the body is formed of fusible material and the distortion is provided by forming a portion of the body out of the plane thereof.

6. The invention as defined in claim 2 wherein the distortion is fixed relative to the body by means of the fusible material soldering the elements together.

7. A heat sensitive closure operating device comprising a cylinder having heads at its ends; a piston longitudinally moveable within the cylinder and having a piston rod extending outwardly through one said head, an expansion spring encircling the piston rod and disposed intermediate the piston and one said head; securing means on the end of said piston rod for securing the outer end thereof to a closure; means for securing the cylinder fixed relative to the closure; and means fusible at a predetermined temperature and disposed intermediate the piston rod and its companion head to effect binding of the rod and arrest telescopic movement thereof, urged by said spring.

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