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(71) Applicant: **Guobys, Remigijus**
LT-14149 Vilniaus raj. sav. (LT)

(72) Inventor: **Guobys, Remigijus**
LT-14149 Vilniaus raj. sav. (LT)

(74) Representative: **Pranevicius, Gediminas**
Law firm VARUL
Konstitucijos pr. 7
09308 Vilnius (LT)

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(54) **Thermal door lock pin**

(57) The present invention relates to fireproof door devices and, in particular, a heat-activated thermal door lock pin that non-deformably blocks the door in the door opening. Each thermal pin of the door lock comprises of an oblong standard-pin-size-and-form sleeve blind in one end having a cylindrical locking piston inside. A thermo-reactive heat expandable material is put between the

blind end of the sleeve and the piston. The open external end of the pin coincident to the edge of the door leaf is closed with a plastic cap.

Door lock pins of such construction do not require additional constructional changes in a door leaf and casing. They are being activated in case of fire exclusively thus eliminating accidental blocking of the door.

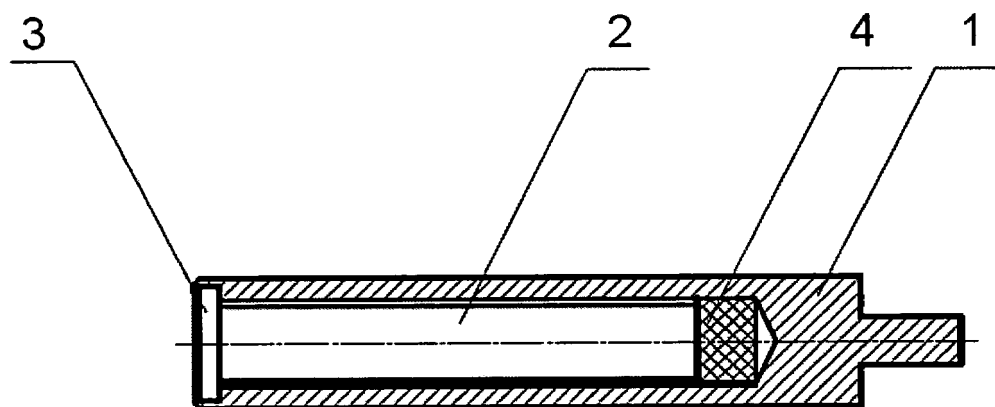


Fig. 1

Description

TECHNICAL FIELD

[0001] The present invention relates to fireproof door devices and, in particular, a heat-activated thermal door lock pin that non-deformably blocks the door in the door opening.

BACKGROUND ART

[0002] Fireproof doors are designed to limit spread of fire and fume in the building by limiting access of air to the premises on fire. According to requirements of fire-safety, the fireproof doors and equipment of such doors have to withstand high temperatures and keep the door shut tightly. The main and the essential disadvantage of fireproof door is that its leaf distorts under high temperatures. This relates to the fact that metal sheet on the heated side of the leaf expands, while the opposite side not affected by high temperature does not change its dimensions. Therefore, the door leaf warps forming a space between a door leaf and a door casing and the door loses impermeability and opens the way for air flow to the premises on fire as well as for spread of heat, fume and fire to adjacent premises.

[0003] The above problem of thermal deformation of doors was resolved in patent No. LT5569 of the same author by using additional heat activated locks mounted in the door leaf along door leaf perimeter and each comprising the spring and the pin mounted inside the cylinder body and closed by a thermofusible cap. In case of fire the caps melt, the springs push the pins into specially designed door casing sockets or openings and, in such way, immovably block the door leaf.

[0004] Similar door leaf blocking in a door opening device comprising a spring-pushed pin mounted in a sleeve, one end of which is blind and the other is closed with a plastic cap, is described in a patent application GB2321492A.

[0005] Disadvantage of the above door blocking devices is the fact that such locks need specific sockets in door leaves and openings in door casings and this makes an additional drawback both from constructional and aesthetical point of view. Another disadvantage of the mentioned devices is that, in case the cap of the pin falls out or breaks accidentally for some reason, the pin will necessarily be pushed out by a mechanical spring and block the door leaf thus blocking the premises itself and people inside it. The door blocked in such way can be opened only with the use of heavy electric cutting and drilling devices.

SUMMARY OF INVENTION

[0006] The goal of the present invention is to offer a device for blocking doors in door casings which would not require additional constructional changes in door

leaves and casings, that is, the construction of the very door and casing remained unchanged.

[0007] Another goal of the present invention is to offer a device for blocking fireproof doors in door casings, which would impermeably and non-deformably block the door in the casing.

[0008] Yet another goal of the invention is a device for blocking doors in door casings that would work in case of fire exclusively, thus eliminating possibility of accidental blocking the door.

[0009] As is known, the door leaf is normally locked in a casing with pins of one or several locks and such pins slip into particular openings in the casing. The goal of the present invention related to non-deformable blocking of the fireproof door leaf in the casing without changing the door construction is solved by replacing the regular pins of a door lock or door locks that usually are solid cylindrical steel bars, with thermal pins of the present invention. Each thermal pin of the door lock comprises an oblong standard-pin-size-and-form sleeve blind in one end and having a cylindrical blocking piston inside. A thermo-reactive heat expandable material is put between the blind end of the sleeve and the piston. The open external end of the pin coincident to edge of the door leaf is closed with a plastic cap.

[0010] Door lock pins of such construction do not require additional constructional changes in doors and casings and eliminate possibility of accidental blocking the doors. The pins are connected with a locking mechanism of the door lock and are usually controlled by a key of the lock to lock or unlock the door. Such pins are mounted in several places of the door leaf in the way that they could lock the door leaf in the casing along the entire perimeter of the door leaf.

BRIEF DESCRIPTION OF DRAWINGS

[0011] Further the invention is described in detail with reference to the drawings, wherein:

Fig.1 is a view of a longitudinal cut of the thermal pin in normal position;

Fig.2 is a view of longitudinal cut of the thermal pin with its position in case of fire.

[0012] As is seen in Fig.1, the thermal pin of the fireproof door lock comprises the cylindrical sleeve 1 of a standard door pin size and shape, with one end blind and an open opposite end. A cylindrical steel piston 2 is mounted inside the sleeve 1 and closed in the sleeve 1 with a plastic cap 3. A thermo-reactive heat expandable material 4 is placed between the cylinder piston 2 and the sleeve 1.

[0013] Such thermal pins are mounted in standard door locks and other points of door leaf instead of regular solid steel pins without changing construction neither of a door leaf nor of a casing in the way they could block the door

leaf in the casing in case of fire along the whole perimeter of the door leaf.

[0014] The thermal pins of the above construction work in the following way: as soon as room temperature in case of fire reaches a critical limit (200°C approximately), the thermo-reactive heat expandable material 4 inside the sleeves 1 of the door locks expands and pushes the steel pistons 2 out. The latter enter particular openings in the door casing and non-deformably block the door leaf thus preventing access of oxygen to the premises on fire and spread of fire to adjacent premises.

[0015] The door blocking device of such construction is characterized by not requiring additional constructional changes in a door leaf and casing, the door is impermeably and non-deformably blocked in a casing in case of fire and the device is activated exclusively in case of fire thus eliminating accidental blocking of the door.

Claims

1. A thermal door lock pin for blocking fireproof doors in their casings in case of fire consisting of a steel piston mounted inside a cylindrical sleeve with one blind end and one open end closed with a plastic cover, **characterised in** comprising a thermo-reactive heat expandable material 4 placed between the cylindrical steel piston 2 and the sleeve 1.
2. The pin according to claim 1, **characterised in that** the reaction temperature of the thermo-reactive heat expandable material 4 is within the range of 150°C-250°C, preferably - about 200°C.

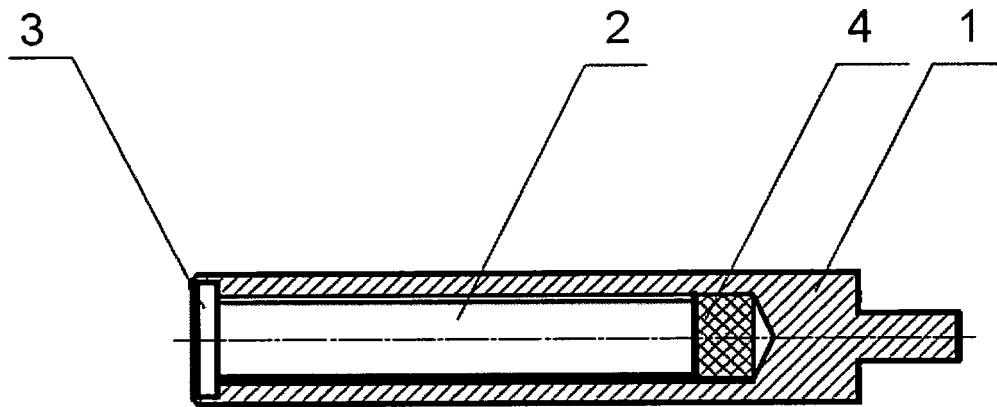


Fig. 1

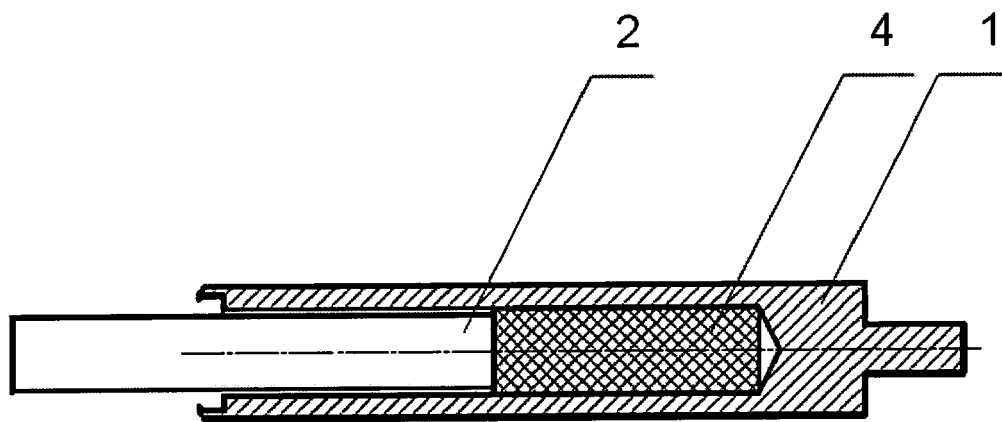


Fig. 2

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- LT 5569 [0003]
- GB 2321492 A [0004]