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(54) **Fire-resistant enclosures.**

(57) The apron sections 12 and 14 in the body and door of a data cabinet are made from steel strips having rows of elongate slots 17 running in the circumferential direction of the closure with the slots in adjacent rows displaced in pitch. These slots thus lie across the temperature gradient from the external skins 2/8 to the internal skins 1/7 of the body and door so that the heat conduction pathways across the aprons are long and tortuous, thus reducing the rate of heat inleak to the cabinet while retaining sufficient structural rigidity in the closure region.

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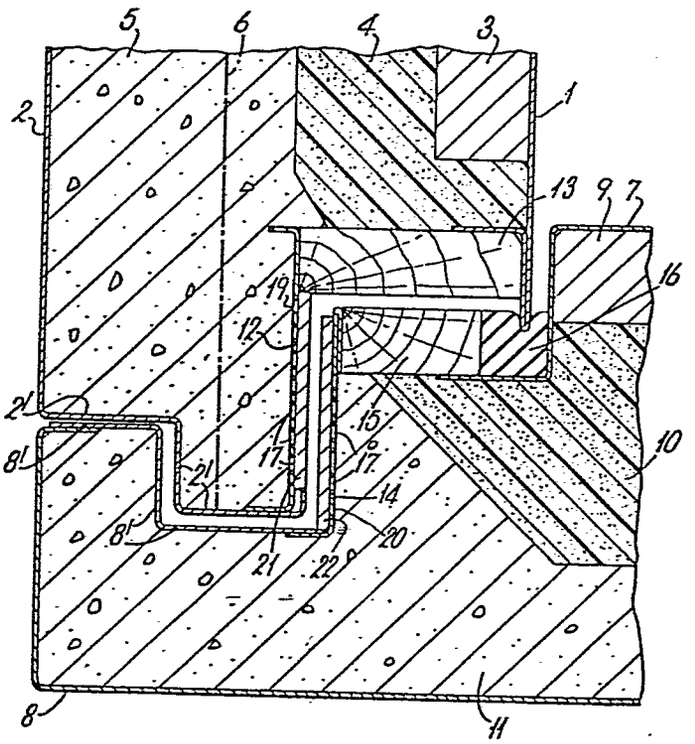
Fig.1.



Fire-Resistant Enclosures

The present invention relates to fire-resistant enclosures for the protection of temperature-sensitive articles and is concerned especially with the construction of fire-resistant cabinets or files intended for the storage of electronic data-processing media such as magnetic discs and tapes. Information stored on magnetic media rapidly degrades if the record carrier is heated to a temperature above about 60°C (or about 50°C in the case of so-called diskettes or floppy discs) and fire-resistant equipment for storing these kinds of material (for convenience termed herein "data cabinets") must therefore be capable of maintaining an internal temperature below the appropriate value at which degradation commences, when exposed to fire conditions over a specified period.

The bodies of data cabinets are conventionally constructed with internal and external steel skins which are joined together around the opening for the door (or other closure member, eg drawer). Between these skins are enclosed selected thermally insulative and/or

absorptive materials which serve to restrict the transfer of heat through the walls of the cabinet from the exterior to its interior. In designing such cabinets it is also important to minimise the amount of heat which can be conducted directly from the external to the internal skin through the structure which defines the margins of the door opening. For this reason, it is commonplace to unite the skins through wooden framing members, since wood is a material of substantially lower thermal conductivity than steel and the wooden frame can thus act as a useful heat-break between the skins. However, to reduce still further the conduction of heat through this region of the cabinet by employing materials of even lower inherent thermal conductivity for this part of the structure conflicts with the need to maintain a structure of sufficient rigidity and load-bearing capacity.

The present invention seeks to provide a solution to this problem and accordingly proposes to configure at least part of the skin of a data cabinet body in the region of the body which defines an access opening for the enclosure in such a way as to define a tortuous path for the conduction of heat through such skin from the exterior to the interior of the enclosure, preferably by providing in that part of the skin a plurality of elongate slots extending in the circumferential direction of the opening (that is to say perpendicular to the temperature gradient from the exterior to the interior). By thus increasing the effective length of the path along which the heat must pass, the effective rate of conduction through the skin to the interior of the cabinet can be reduced, notwithstanding that the material of the skin has a relatively high inherent

thermal conductivity. The performance of the cabinet may therefore be improved while still retaining a traditional high-strength material - notably steel - as the primary skin material.

A similar technique may be applied to the skin structure of the door, drawer or other closure member for a data cabinet.

The nature of the invention will be more fully understood from the ensuing description of a preferred embodiment thereof, taken in conjunction with the accompanying drawings, in which:

Figure 1 is a horizontal section taken through one portion of a data cabinet in accordance with the invention, showing the junction of its door and body and

Figure 2 is a side elevation of one form of steel strip for use in constructing an apron portion of the cabinet's door or body.

Referring to Figure 1, the illustrated cabinet is preferably constructed in accordance with the process described in our published United Kingdom patent application No.2153405 and has a body with inner and outer steel skins 1 and 2 between which are encased successive layers of "phase-change" material 3, polyurethane or other insulative foam 4, and an outer layer of concrete, plaster or the like water-bearing material reinforced by a steel mesh 6. The door of the cabinet likewise comprises inner and outer steel skins 7 and 8 between which are encased successive layers of the same "phase-change", insulative and water-bearing materials 9/10/11.

In the region of its junction with the door, the skin on the cabinet body includes a steel apron 12 which is attached to the inner skin 1 through a timber heat-break frame 13. The surface of the door which faces the body apron 12 is likewise formed as a steel apron 14 which is attached to its inner skin 7 through another timber heat-break frame 15. A door seal 16 is also carried in a rebate between the frame 15 and skin 17. In each of the aprons 12 and 14 there are formed rows of elongate slots 17, running in the circumferential direction of the door opening, which together with the respective timber frames 13 and 15 serve to reduce the rate of heat conduction from the respective outer to the respective inner skins of the body and door under fire conditions.

Figure 2 illustrates one example of a steel strip which can be used for constructing the aprons 12,14. In this case there are five rows of the slots 17, although it will be appreciated that the number of rows employed in any particular construction is open to considerable variation in accordance with the dimensions of the apron concerned. The slots are provided in a repeating pattern along the length of the strip with the slots in each row displaced from those in the next adjacent rows by one half pitch. There are thus defined between the slots a series of "bridges" 18 spaced across the strip in staggered relation sufficient to maintain the structural integrity of the strip for the service it must perform, but so disposed that the heat conduction pathways across the strip (that is to say from the exterior to the interior of the cabinet) are long and tortuous, involving passage in the direction parallel to the slots 17 from one "bridge" 18 to the next.

In the course of constructing the cabinet body and door the respective water-bearing layers 5 and 11 are cast in-situ. The slots 17 in each apron 12,14 are accordingly covered on the inside with adhesive tape 19,20 (Figure 1) to prevent extrusion of the water-bearing paste through the slots. In the final assembly the slotted aprons 12,14 are conveniently faced with strips of intumescent material 21,22 adapted to swell up and seal the air gap between the door and body under fire conditions.

Although in the embodiment of cabinet illustrated herein the slots 17 are provided only in the "apron" sections 12 and 14 of the door and body it is envisaged that still better performance may be achieved from the cabinet by including similar slots or equivalent relieved portions also in the metal skin sections outwardly adjacent thereto, such as in the faces designated as 2' and 8' in Figure 1.

CLAIMS

1. An enclosure for the protection of temperature-sensitive articles, the body of which comprises one or more layers of thermal barrier material (3, 4, 5) enclosed by a skin (1, 2, 2', 12) at least in the region of said body which defines an access opening for the enclosure; characterised in that at least part of said skin (12) in said region is configured in such a way (17) as to define a tortuous path for the conduction of heat through such skin (12) from the exterior to the interior of the cabinet.

2. An enclosure for the protection of temperature-sensitive articles, the closure member for an access opening of which comprises one or more layers of thermal barrier material (9, 10, 11) enclosed by a skin (7, 8, 8', 14) at least in the region of said closure member which is juxtaposed to the body of the enclosure around said access opening; characterised in that at least part of said skin (14) in said region is configured in such a way (17) as to define a tortuous path for the conduction of heat through such skin (14) from the exterior to the interior of the cabinet.

3. An enclosure according to claim 1 or claim 2 wherein there are provided in the aforesaid part of said skin (12, 14) a plurality of elongate slots (17) extending in the circumferential direction of the access opening.

4. An enclosure according to claim 3 wherein there are a plurality of parallel rows of said slots (17), with the slots in each row being displaced in pitch from the slots in the next adjacent row(s).

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Fig.1.

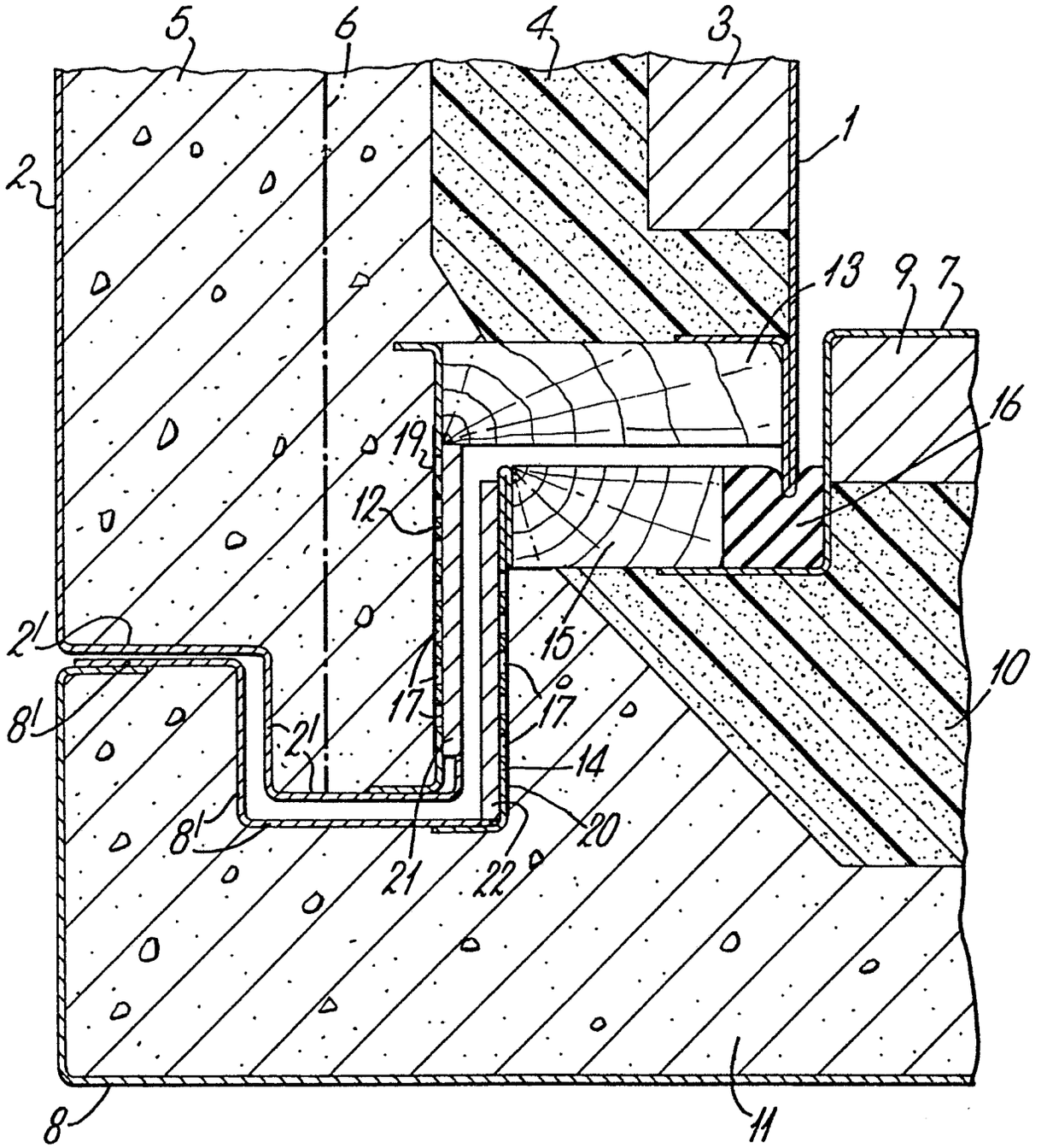

Fig. 2.