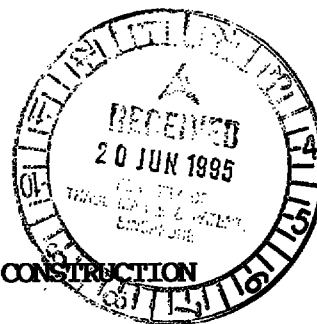




IMPROVED DOOR FRAME OR LIKE FRAME CONSTRUCTION

This invention relates to construction of door frames or the like and more especially to door frames useful to protect against the spread of fire.

Traditionally door frames are constructed from steel or wood. However the price of wood is increasing due to the pressure on supplies of suitable timber trees. Moreover, steel frames are even more expensive and are difficult to manufacture.

Traditional wooden frames can change shape and dimensions especially when subjected to heat stresses or atmospheric humidity changes and will eventually drop. Likewise, metal frames or components will corrode.

The present invention sets out to provide a fire-resistant door frame, and in one aspect consists in a door or like frame, or a kit of parts assemblable to make such a frame, composed of a cast, set and hardened solid material produced from a water-containing castable composition comprising cement and/or gypsum with a lightweight particulate aggregate and/or a fibrous aggregate.

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Cement is a fine calcined power typically containing silica, alumina, lime (i.e. calcium oxide) and often iron oxide and magnesia. Gypsum is finely divided calcium sulphate, and is useable as a calcined powder. In this invention either cement or gypsum or a combination of the two materials may be used.

The fibrous aggregate is used to prevent cracking of the frames and may be exemplified by hay, straw, cane, reeds or coconut husks, chopped to a suitable size for mixing. Industrially processed materials may also be used, such as chopped fragments of wire mesh, fragments of high tensile strength polymeric mesh, wood shavings, chopped cardboard, paper fibre, fibre-glass, rayon fibres, and polyolefin fibres from petrochemical industry especially polypropylene fibres.

The lightweight aggregate will increase the thermal insulation properties of the frames. Examples of aggregate materials are pearlite; exfoliated vermiculite; pumice particles; pellets of sintered pulverized fuel ash; heat expanded slate particles as produced in a rotary kiln; expanded slag particles; aerated sand materials produced by autoclaving; or foamed polystyrene beads.

To reduce cracking or chipping of the component part, chamfers or radiussed edges may be incorporated to



the frames.

The door frame can be fabricated using either timber or steel moulds, in the required profile to suit the door panel thickness and wall thickness and comply with architectural requirements. If desired the castable composition may include plasticizers.

Backing pieces (or cavities) can be cast insitu to provide "keys" to the adjacent wall.

The frames may be cast as a whole door frame, requiring no joints, or may be cast to provide a kit or assembly of related component parts optionally with steel reinforcements such as wire mesh, stiffener bars etc, welded together. Channels cast in the cement or gypsum frame part may allow suitably profiled steel sheet to be screwed into the frame.

If desired, moulds can be used on site to make the frames as part of the wall when pre-casting concrete.

The frames can be cast with pre-set reinforcements to mount hardware such as hinges, lock plates, and door closers. The reinforcements can be wood block reinforcements or metal plate reinforcements, conveniently threaded to facilitate screwing.

Alternatively the frame part of a hinge can be precast into the frame so as to eliminate drilling or screwing for the site.

Surface-mounted hardware such as hinges, door closer arms, etc can be screwed directly into the frame using epoxy grout.

To give the frame a timber-like appearance, printed laminates or real wood veneers can be used.

The frames can be held in place with metal strips screwed on or nailed to the back of the frames and attached to the wall by means of screws, nails, or expansion bolts. Alternatively they can be set in cement (for block work) or attached by holdfasts cut into the back of the frame.

The invention will be further described with reference to the accompanying drawings, in which: -

Figures 1 to 6 show in cross-section suitable profiles for the component parts of a door frame in accordance with the invention;

Figure 7 shows in cross-section one embodiment of an attachment of a typical door frame part to an existing wall;

Figures 8 and 9 show two embodiments of attachment of a door frame part useful for further attachment to a wall in course of construction;

Figure 10 shows in perspective an alternative attachment member to those of Figures 8 and 9; and

Figures 11 and 12 show in perspective view possible corner fixing arrangements for door frame parts.

Figure 1 shows in cross-section a typical door frame part 1, exhibiting a double rebate at the regions 2 and 3.

Figure 2 shows similarly another typical door frame section 4, but exhibiting only a single rebate 5.

Figure 3 shows in cross-section a similar frame part to that of Figure 1, utilizing the same reference numerals, but having chamfered edges where indicated at 6.

Figure 4 shows in cross-section a similar door frame part cross-section to that shown in Figure 2, but having rounded edges where indicated at 7.

Figure 5 shows a more elaborate form of door frame,

in which in addition to the single rebate 5 there is an integral backing piece 8 extending along the frame component.

Figure 6 shows in cross-section a similar door frame, with a single rebate 5, having in this instance a channel 9 extending along its length.

Figure 7 shows how a typical door frame (e.g. that of Figure 2) may be attached to a pre-existing wall 11. The attachment is effected by a metal strap 12 which is screwed at suitable locations 13 to the door frame and bent to fit to either face of the existing wall at 15 and 16. The strap is secured at its free end at these locations 15 or 16 by suitable nails or screws 17 and 18. The whole assembly can be plastered over at 20 as indicated.

Figure 8 shows a typical door frame component in cross-section having attached thereto a "fishtail" fixing device whereby it can be keyed to a wall in course of construction. This fixing device has an elongate main body 22, split from one end at 23 and attached at the other end by means of a flange 24 bent at 90° and attached by suitable screw 25 to the door frame component of for example, Figure 2.

Figure 9 shows a similar arrangement with a fishtail



fixing component, in which the component is received at its bent end 24 within a channel 9 as shown in figure 6.

Figure 10 shows an alternative form of fishtail. The main body of 22 and of the end portion 24 are clearly shown in this figure, and an alternative to the slit two perforations 25 extend through the main portion of the fixing component.

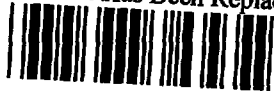
Figure 11 shows how two framed components can be assembled at right angles by means of a butt joint. Such components are, for example, as shown in figure 1 and one of the components (as shown, the upright) is so fashioned at each end as to accept the profile of the other component for attachment by screws 28 and 29 through the thickness of one component and into the end face of the other component.

Figure 12 shows a different such arrangement. In this a frame portion, formed with a channel 9 e.g. as in Figure 6, is cut at a 45° mitre to assemble with a similar frame portion as a mitred joint secured by a metal corner 32 and suitable fixings 33 and 34.



CLAIMS:

1. A door or like frame composed of a cast, set and hardened material produced from a water-containing castable composition comprising cement and/or gypsum with a lightweight particulate aggregate and/or a fibrous aggregate.
2. A frame according to claim 1, wherein the fibrous aggregate comprises hay, straw, cane, reeds, coconut husks, chopped fragments of wire mesh, fragments of high tensile strength polymeric mesh, wood shavings, chopped cardboard, paper fibre, fibreglass, rayon fibres or polyolefin fibres.
3. A frame according to claim 1 or 2, wherein the light weight aggregate comprises pearlite, exfoliated vermiculite, pumice particles, pellets of sintered pulverized fuel ash, heat expanded slate particles, expanded slag particles, aerated sand materials or foamed polystyrene beads.
4. A door frame according to any one of claims 1 to 3, wherein chamfers or radiussed edges are incorporated in the frames.
5. A frame according to any of the preceding claims, wherein backing pieces or cavities are integrally cast



in the frame, to provide keying means for attachment to a wall.

6. A frame according to any of the preceding claims, wherein the castable material further contains plasticizers.

7. A frame according to any of the preceding claims, being cast with pre-set reinforcement means for mounting hardware.

8. A frame according to claim 7, wherein the reinforcement means comprises a wood block reinforcement or metal plate reinforcement.

9. A frame according to any of the preceding claims, wherein surface-mounted hardware is screwed into the frame using epoxy grout.

10. A frame according to any of the preceding claims, further comprising metal strips for attaching the frame to a wall.

11. A kit of parts assemblable to make a frame as set out in any of the preceding claims.

12. A method of manufacturing a door frame or kit according to any of claims 1 to 10, comprising casting a



water-containing composition comprising cement and/or gypsum with a lightweight particular aggregate and/or a fibrous aggregate, and allowing the composition to set and harden.

13. A method according to claim 11, wherein a whole door frame is cast.

14. A method according to claim 11, wherein a kit or assembly of related component parts are cast.

15. The method of any of claims 11 to 13, wherein pre-set reinforcement means for mounting hardware are cast with the frame.

16. A door or like frame, or kit of parts assemblable to make such a frame, substantially as herein disclosed with a reference to figures 1 to 11 of the present application.

17. A method of manufacturing a door or like frame or a kit of parts assemblable to make such a frame, substantially as herein described with reference to the accompanying drawings.