April 2, 1968 B. BURSIEK ETAL 3,375,627

METHOD OF ANCHORING A FRAME IN AN OPENING

Filed Feb. 23, 1966 3 Sheets-Sheet 1

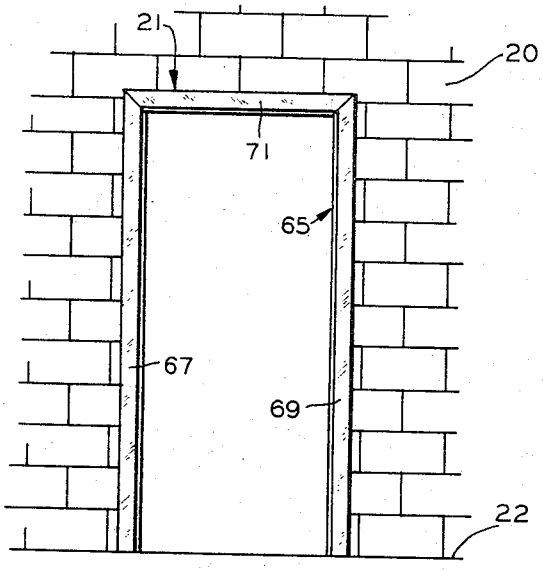


FIG. 1

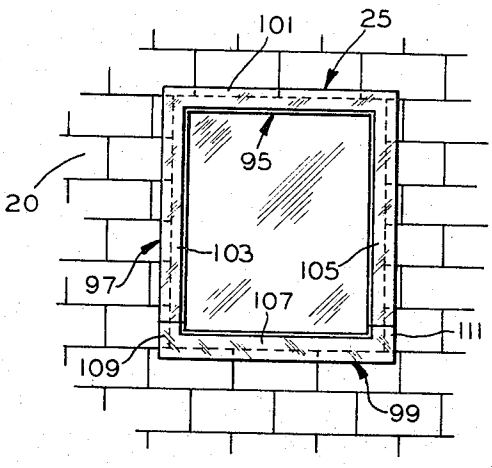


FIG. 2

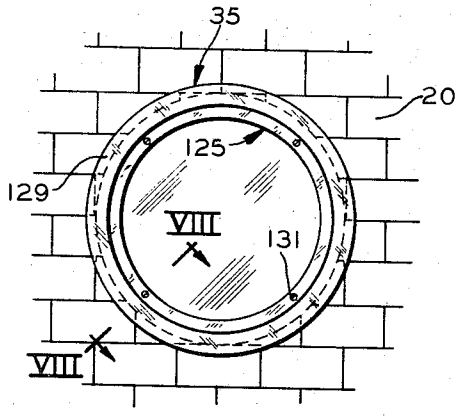


FIG. 3

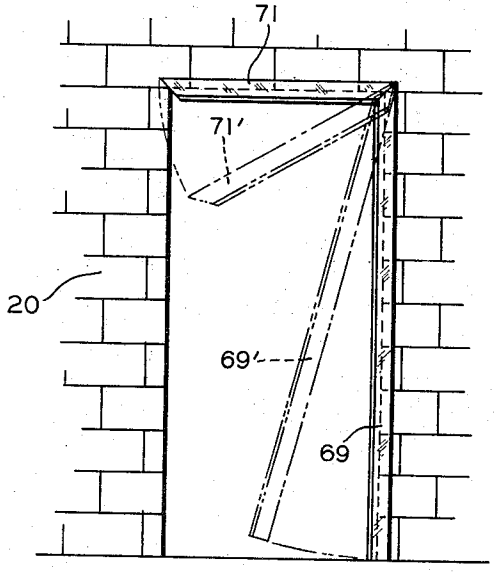


FIG. 5

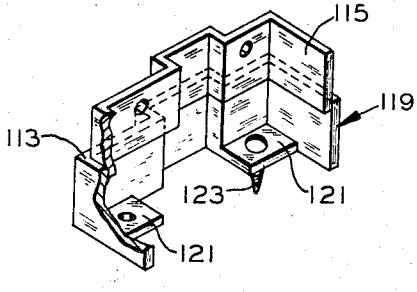


FIG. 7

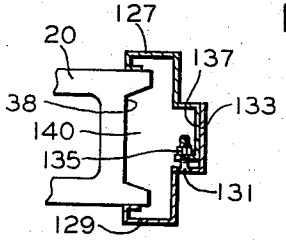


FIG. 8

INVENTOR.
BILL BURSIEK
ELDON L. MARTIN

Hugh A. Kirk

ATTORNEY

April 2, 1968 B. BURSIEK ETAL 3,375,627

METHOD OF ANCHORING A FRAME IN AN OPENING

Filed Feb. 23, 1966 3 Sheets-Sheet 2

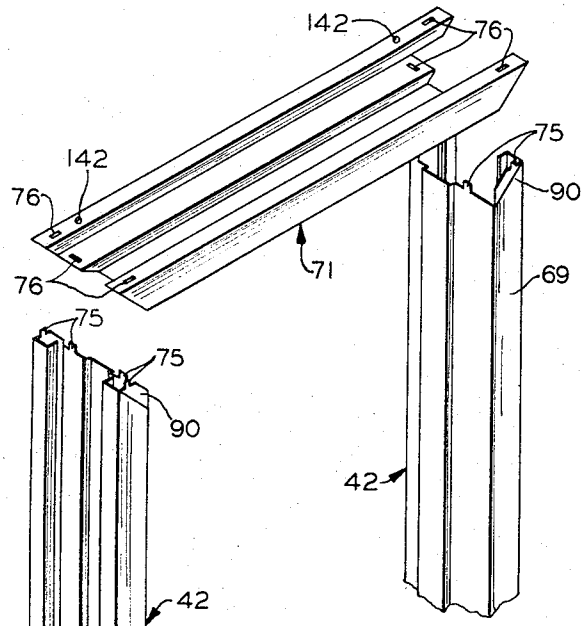


FIG. 4

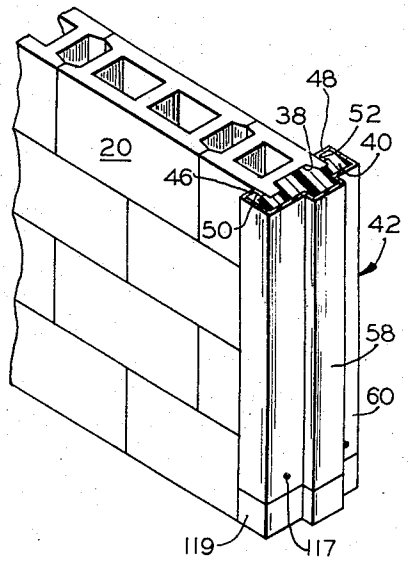
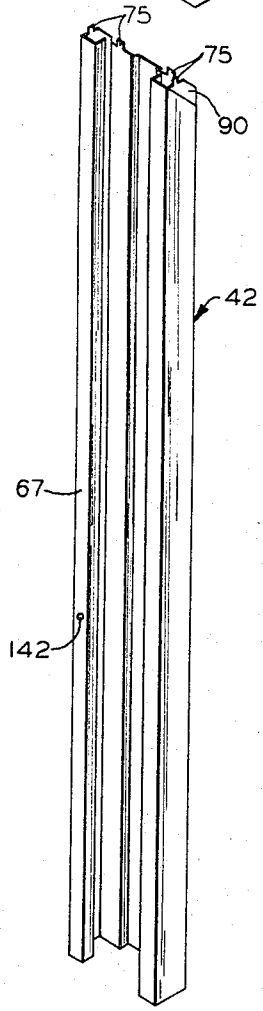


FIG. 6



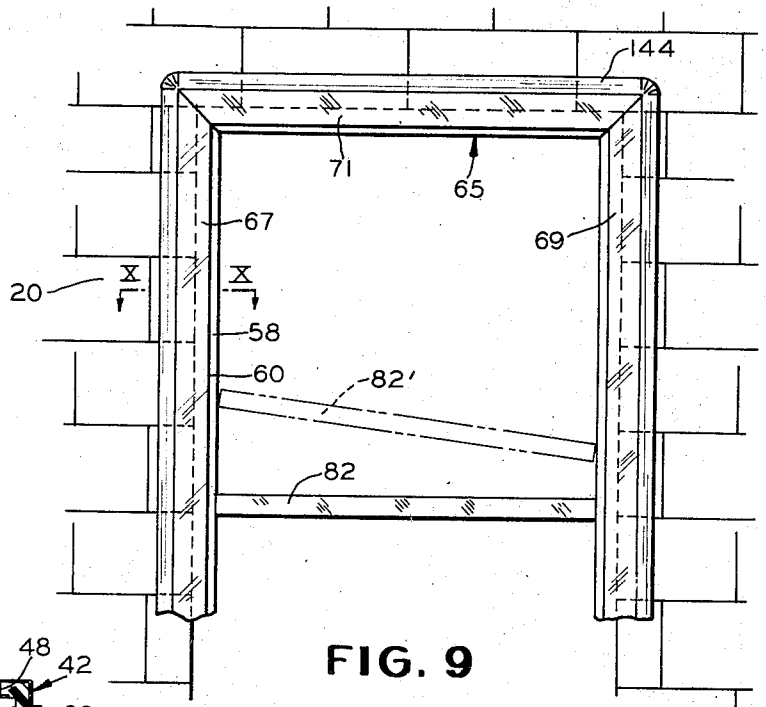


FIG. 9

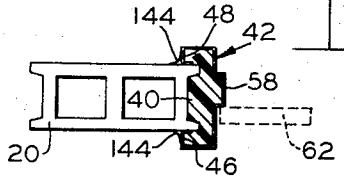


FIG. 10

INVENTOR.
BILL BURSIEK
ELDON L. MARTIN

ATTORNEY

April 2, 1968 B. BURSIEK ETAL 3,375,627

METHOD OF ANCHORING A FRAME IN AN OPENING

Filed Feb. 23, 1966 3 Sheets-Sheet 3

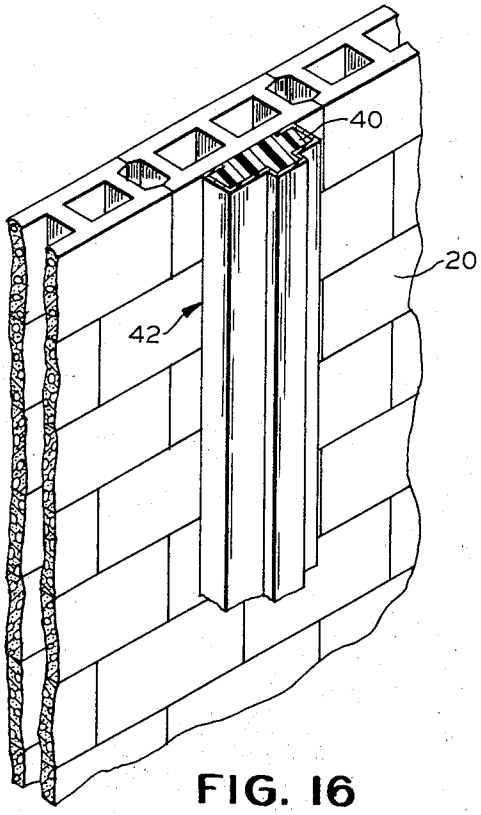


FIG. 16

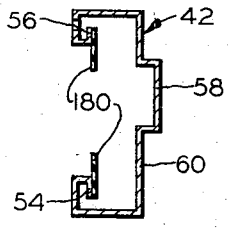


FIG. 11

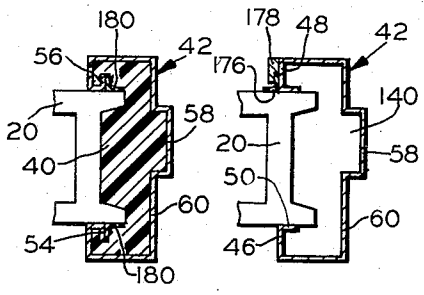


FIG. 12 FIG. 13

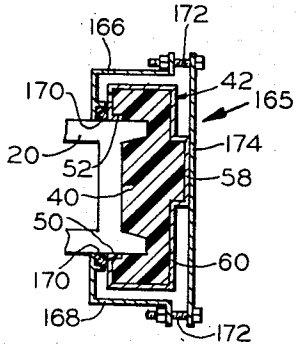


FIG. 14

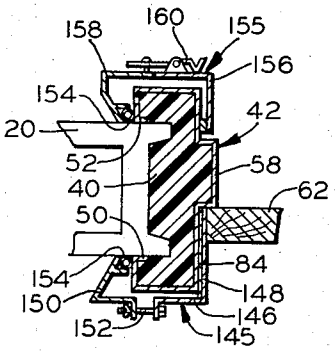


FIG. 15

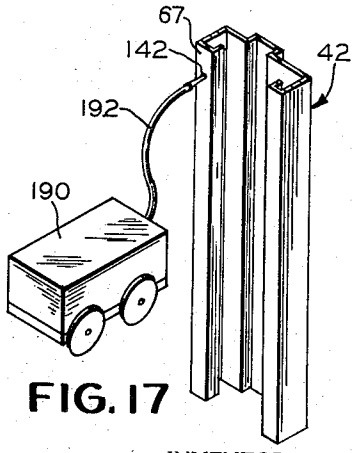


FIG. 17

INVENTOR.
BILL BURSIEK
ELDON L. MARTIN

ATTORNEY

United States Patent Office

3,375,627

Patented Apr. 2, 1968

3,375,627

METHOD OF ANCHORING A FRAME IN AN OPENING

Bill Bursiek, R.F.D. 1, and Eldon L. Martin, 110 Lincoln St., both of Cygnet, Ohio 43413

Filed Feb. 23, 1966, Ser. No. 529,292

15 Claims. (Cl. 52—213)

ABSTRACT OF THE DISCLOSURE

A wall having an opening at least part of whose edges are surrounded by a frame that forms a chamber between it and the edges of the opening, and then expanding in situ in this chamber a foam forming plastic material to fill the chamber and anchor the frame in the opening. The cracks between the frame and the edges of the opening are sealed by a temporary or permanent sealing means attached to the wall abutting edges of the frame, and temporary bracing means may be employed inside the frame to counteract the expanding pressure of the plastic material while filling the chamber.

Background of the invention

Up to the present time the installation of door and window frames has been a critical phase of construction. Prefabricated casements had many advantages over those which were custom made at the building site but even the prefabricated casements were not free from problems. In some construction, particularly in construction involving placement of prefabricated metal casements in masonry wall openings, the casements normally had to be set in place and the masonry erected around them. The casements in most such instances were in a semi-finished or finished state and were readily damaged by the vagaries of construction. In the case of door casements, misalignment of the casing members might go unnoticed until the normally much later step of hanging a finished door thereon was attempted.

Generally speaking, the framed opening comprises a rough opening in a wall section of a building. The frame or casement the opening may may be a set of interlocking vertical and horizontal members which may be inserted singularly or jointly in the rough opening and adjustably held in place therein. If the frame is rectangular and has only three of the four possible side members, a brace means may be provided to hold the two parallel sides parallel until the frame is anchored in place. If a door is to be used in the framed opening, the door itself may be installed and used as a brace means by shimming between the door and the frame to maintain functional clearance between them. The frame members are generally U-shaped in cross-section so that when they are placed in a properly dimensioned rough opening a limited space remains between the frame and the wall. If the open end of the U-shaped cross-section does not closely fit the wall section, a seal means may be provided to seal the gap therebetween and to form a sealed chamber. An expandable plastic, such as a urethane foam formulation, may be placed in the chamber and caused to expand and fill the chamber and later harden into a relatively rigid mass which anchors the frame to the wall section. This expandable plastic may be injected into the chamber through holes in the frame or it may be applied to the interior of the frame before the erection of the frame.

Since this invention, frames may be set and anchored in place after the rough construction has been completed and even after all of the other finishing work has been done. For this reason there is less likelihood of their being damaged. There is a further advantage of giving the contractor more latitude in planning the order of construction since the casements or frames no longer need be included in the critical list of materials that could stop production prior to its final stages.

Accordingly, it is an object of this invention to produce an effective, simple, efficient, durable and readily constructed framed opening for a building which may be completed at any time subsequent to the erection of the wall members defining its rough opening.

It is another object of this invention to produce a framed opening in which the frame is anchored to adjacent wall sections by an expanded plastic that weather-seals the frame.

It is a further object of this invention to produce a framed opening in which the frames may be prefinished and may be installed together with a prehung prefinished closure member.

Brief description of the drawings

The above-mentioned and other features and objects of this invention and the manner of attaining them will become more apparent and the invention itself will be best understood by reference to the following description of an embodiment of the invention taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is a front view of an embodiment of a framed opening of this invention showing a rectangular opening in a wall having frame members on three sides;

FIG. 2 is a front view of another embodiment of this invention with frame members on four sides of a rectangular opening in a wall;

FIG. 3 is a front view of still another embodiment of this invention showing a framed circular opening in a wall;

FIG. 4 is an enlarged separated perspective view of the frame shown in FIG. 1, showing the interfitted mitered corners;

FIG. 5 is a front view of the top and one side member of the frame shown in FIG. 1 with these members in full lines in final position and in dashed lines how they can be assembled before being moved into final position;

FIG. 6 is an enlarged perspective view of a horizontally sectioned lower portion of a frame similar to that shown in FIG. 1 or FIG. 2, showing the expanded plastic anchoring material between the frame and the opening, but with an insertable foot member, in place of an insertable transverse base member as shown in FIG. 2;

FIG. 7 is a further enlarged perspective view of the insertable foot member shown in FIG. 6, showing means for fastening the foot member to the frame member and to the bottom of the opening;

FIG. 8 is an enlarged cross-sectional view taken along lines VIII—VIII of the circular frame shown in FIG. 3;

FIG. 9 is an enlarged front view of the framed opening shown in FIG. 1 with its lower section broken away and showing an adhesive tape seal around the periphery of the frame with a removable brace between vertical jamb members of the frame ready for the plastic material to be expanded between the frame and edge of the opening to anchor the frame in place;

FIG. 10 is a sectional view of the framed opening taken along line X—X shown in FIG. 9, and showing a section of a door in dashed lines;

FIG. 11 is an enlarged cross-sectional view of a frame member of this invention showing an interiorally attached flexible seal;

FIG. 12 is also a cross-sectional view of the frame member shown in FIG. 11, but showing it installed on a wall section with an expanded plastic in the sealed space between the frame and the wall;

FIG. 13 is a cross-sectional view of a frame member of this invention similar to FIG. 12, but of another embodiment with a flexible seal removably secured in position on the exterior of the frame member by a magnetic element;

FIG. 14 is a cross-sectional view of the frame member similar to that shown in FIG. 12 but with a clamping means for holding a seal member;

FIG. 15 is a cross-sectional view of the frame member shown in FIG. 14, but with the seal means on one side held in place by a bracket shim wedged between a door and the frame, and on the other side by a cam lock bracket means;

FIG. 16 is a horizontally sectioned perspective view of a jamb member of the type frame shown in FIG. 1, but with the frame attached to the face of a wall by the expanded plastic; and

FIG. 17 shows an enlarged perspective view of a lower section of frame with a diagrammatic view of a blending apparatus for injecting an expandable plastic into the chamber between the frame and the edges of the wall opening through small inlet holes in the frame.

Detailed description of the preferred embodiment

Wall openings

Referring to the drawings, FIG. 1 shows a structural wall, such as a masonry wall **20**, with a framed rectangular opening **21** extending to the base **22** of the wall. FIGS. 2 and 3 show a structural wall **20** with a framed rectangular opening **25** and a framed circular opening **35**, respectively, each lying intermediate the top and base of the wall. The wall **20** which has substantial thickness such as is shown in FIG. 6 may be erected around an assembled frame, or may be erected without the frame but with an opening for a frame. The rough opening may even be cut through the wall long after its erection such as might be required in remodeling an existing structure. The dimensions of the opening relative to the frame may be such that the peripheral dimensions of the wall opening roughly exceed the inner peripheral dimensions of the frame but are less than the outer peripheral dimensions of the frame. The peripheral surface of the opening is preferably rough in texture and may have recessed or irregular cross-sections **38** (see FIG. 6) designed to promote mechanical and adhesive bonding of the plastic material **40** thereto.

Frame members

The frame members for the opening such as frame member **42** in FIGS. 4, 6, and 10 through 16 may have generally shallow U-shaped or boxlike cross-sections with the spaced edges **46** and **48** thereof bent toward each other thereby reducing the opening or throat dimensions to slightly larger than the thickness of the structural wall **20**. In some installations an interference fit between the wall **20** and the frame members may be preferred to help prevent the escape of the plastic material from the chamber. A better seal and additional rigidity may be provided if the spaced edges **46** and **48** of the frame are continued and bent to provide a surface **50**, **52** parallel to the wall **20** as shown in FIGS. 6, 10, 13, 14 and 15 or further continued and bent to provide an interior lip **54**, **56** or bead as shown in FIGS. 11 and 12. A boxlike ridge **58** may protrude slightly into the opening from the main inner peripheral surface **60** of the frame and function as a door or window stop when a closure member **62** (see FIGS. 10 and 15) is used in the framed opening.

Since the outer dimensions of the frame normally exceed the inner dimensions of the opening, means are provided which permit the placement of each relatively larger frame member in its respective relatively smaller opening. FIGS. 1, 4, 5 and 9 show a three piece frame **65** having two spaced apart vertical jamb members **67**, **69** spanned at their top by a horizontal member **71**. Preferably the frame members **67**, **69** and **71** have means at their adjoining ends such as tabs **75** and slots **76** (see FIG. 4) for securing the end of one frame member to the adjoining end of its mating frame member. These tabs **75** and slots **76** may be engaged while one frame member **71** is in final position and the adjoining frame member **69'** is in diagonal dashed line position with respect to the opening as shown in FIG. 5. Then the diagonally disposed member **69'** may be rotated in the plane of the opening until the right angular full line position **69** is reached. The third member **67** thereafter may be likewise positioned and final adjustments may be made to insure that the assembled frame is plumb and square. The frame may be braced in this position by one or more horizontal removable braces **82** as shown in full lines in FIG. 9 or by slanted removable braces **82'** shown in dashed lines. Braces **82** or **82'** span the opening between the lower ends of the vertical frame members **67** and **69**. When a closure member such as a door **62** is to be used in the opening it may be used as a brace means and shims **84** (see FIG. 15) may be inserted at critical points between the closure member and the frame to insure a proper fit and adequate bracing against the expanding force of the plastic anchoring means **40**.

The facial surfaces of the frame members which are disposed parallel to the wall may be mitered at their adjoining ends. An offset section or backup plate **90** (see FIG. 4) may underlay each corner and may be attached to one of the adjoining frame members **67**, **69**, or **71** to maintain a planar relationship between the facial surfaces of the corner sections.

FIG. 2 shows a framed opening **25** having an insertable two-piece frame **95** comprised of an upper member **97** and an interfitting base member **99**. The upper member **97** may have a horizontal section **101** with a depending vertical jamb section **103** or **105** integrally attached at each end of the horizontal section, such as by welding. Preferably the overall dimensions of the assembled frame **95** exceed the dimensions of the rough opening in the wall but nevertheless the frame **95** may be inserted after completion of the rough opening. The overall height of the upper frame member **97** may be less than that of the rough opening thereby permitting the insertion of the upper member **97** in the opening in an upright position with one side **105** or **103** of the frame engaging and straddling a vertical portion of the wall **20**. The relative dimensions are such that when one jamb section **105** or **103** of the upper member **97** is moved into its initial laterally extreme position against the wall, the upper member **97** may be rotated into the plane of the wall **20** so that the opposite jamb section **103** or **105** is in straddling alignment with the wall **20**. The upper member **97** may then be moved laterally to a medium position and then elevated to an extreme position which permits the positioning of the base member **99** in a similar manner. The base member **99** may have a horizontal section **107** with a stub section **109** or **111** of jamb extending upwardly slightly from each end. The upper ends of the stub sections **109** and **111** of jamb may have a thin horizontal ledge **113** (see also FIG. 7) and a recessed backup flange **115** to receive and hold the ends of the corresponding jamb sections **103** and **105** of the upper frame member **97** which may be lowered in place thereon. Fastening means such as sheet metal screws **117** shown in FIG. 6, may be used to hold the telescoping jamb sections together.

Similar stub sections **119** of jamb, as shown in FIGS. 6 and 7, may be used without a spanning base section **107**. An integral anchoring flange **121** with a hole for containing a fastener such as a nail or screw **123** may be provided at the bottom of each stub section to hold it in position in the opening.

FIG. 3 shows a circular framed opening **35** having a two-piece frame **125** with symmetrical annular sections **127** and **129** (see also FIG. 8) which may be inserted into the rough circular opening, one from each side, and held together by a fastening means such as screws **131**.

The circular frame **125** when assembled may have a cross-section similar to that of the rectangular frames **65** and **95** but having an overlapping centrally located joint **133** as shown in FIG. 8. The fastening means may comprise lugs or nuts **135** with threaded holes perpendicular to the plane of the opening attached to the interior surface **137** of the inner lapping section **127**. Countersunk holes aligned with the threaded holes may be provided in the opposite frame member **129** for the reception of screws **131** which may hold the two annular frame sections **127** and **129** together.

When the frames **65**, **95** and **125** are positioned in rough openings, a limited space or chamber **140** (see FIGS. 8 and 13) is formed between the edge of the wall **20** and the inside of the U-shaped frame, thus the wall **20** substantially closes the open channel of the U-shaped frame sections. This also can be done by the flat side of a wall **20** as shown in FIG. 16. An expandable plastic may be placed on the chamber surfaces prior to the positioning of the frames in the rough opening or into the chamber area through inlet holes **142** after the frames are positioned. The inlet holes **142** are preferably located at intervals along the outer peripheral edge of the frame **65**, **95** or **125** as shown in FIG. 4.

Chamber seals

When liquid plastics are used, a seal means may be employed to more perfectly seal the chamber **140** and prevent the loss of the expandable plastic materials which are placed therein for anchoring the frames to the wall openings.

FIGS. 9 and 10 show an adhesive tape seal **144** which is applied externally at the juncture of the frame **65** and the wall **20**. Mechanically held seals such as those shown in FIGS. 14 and 15 may also be used. FIG. 15 shows a two-piece bracket **145** having an L-shaped member **146** which conforms to a section of the frame and one leg **148** of which may be inserted and held in place between a closure member **62** and the frame. The inserted section of leg **148** may also serve as a shim for maintaining proper spacing between the closure member **62** and the frame **42**. An angular member **150** may be adjustably attached at one end by a nut and bolt means **152** to the free end of the L-shaped member **146**. The other end of the angular member **150** may carry a resilient seal **154** such as a piece of weather-stripping, which may be compressed against the frame **42** and the wall **20** and seal the crevice therebetween. Instead of or together with the bracket **145**, a two-piece clamp-on seal means **155** as shown also in FIG. 15, may be employed. The L-shaped member **156** and the angular member **158** of this clamp-on seal **155** are similar to those of seal bracket **145** but the clamping and compressive forces are applied with a cam lock clamp **160**.

FIG. 14 shows another mechanically held seal means **165** where two L-shaped brackets **166** and **168** each having resilient sealing strips **170** are adjustably attached by threaded means **172** to one or more flat brackets **174** which span the frame member **42**.

The crevice between the frame **42** and the wall **20** may also be sealed by a resilient seal member **176** which may be held in place against a metallic frame by a removable strip or bar **178** having magnetic properties, such as is shown in FIG. 13.

FIGS. 11 and 12 show a flexible seal member **180** attached to the interior lips **54** and **56** of the frame **42** adjacent and along the open channel of the frame so that a linear portion of the seal engages the opposite sides of the wall **20** when the frame **42** is positioned on the wall **20** so that the expansive pressure of the expandable plastic material in the chamber **140** will tend to press the seal **180** into tight engagement with the wall **20**.

Chamber fillers

The material **40** for anchoring and sealing the frame **65**, **95** or **125** in a rough opening may be a plastic formulation having an initial volume substantially less than the volume of the void or chamber **140** formed between the frame and the rough opening and also having a capability of filling the void **140** by subsequent expansion. The reactive ingredients may be in the form of unexpanded or partially expanded fusible solids, gels and liquids and may also include compressed gases. These reactants may be placed or put into the chamber area at any time prior to their complete expansion. Preferably the resultant foam bonds itself to the walls of the chamber **140** and sets to a firm or rigid, non-brittle seamless cellular mass which provides overall interior backing and support to the frame **65**, **95**, **125**. Foams having densities from about 1 to 60 pounds per cubic foot may be used but a density of from 2 to 10 pounds per cubic foot is favored based on physical and insulative properties and economic considerations.

The expandable material may be selected from substances such as polyurethane, polyethylene, polystyrene, epoxy, polyvinyl chloride, phenolic, urea formaldehyde, silicone, cellulose acetate, acrylic, natural rubber, synthetic rubber or the like foam, which are capable of producing a set cellular mass and furnishing firm support to the frame in the opening. Thus almost every commercially available thermosetting and some thermoplastic materials have some characteristics which make them adaptable for use in framed openings **15**, **25** and **35**. For example, both silicone and epoxy formulations may be used in framed openings subjected to high temperature environments. Polyurethane foams are well adapted to general construction applications and since by various formulations they may be made to possess many of the physical characteristics of the other forms, the polyurethane foams will be treated in an exemplary manner herein.

Basically the polyurethane foam is produced by an exothermic reaction between a polyol, such as a polyether or polyester, and an isocyanate in the presence of a catalyst and an aerating means. The number and disposition of the terminating hydroxyl units of the polyol are one of the main determinants of the physical properties of the resultant foam. A polyol, such as a relatively non-linear highly branched polyether having hydroxyl numbers in the range of 350 to 600 may be used to produce a relatively rigid foam. This preferred range may be extended so long as the resultant foam is not so brittle as to lack durability or so flexible that it does not possess sufficient firmness for support.

An isocyanate, such as polymethylene polyphenyl isocyanate, 2,4-toluene diisocyanate, 2,6-toluene diisocyanate, or p,p'-diphenylmethane diisocyanate, when brought in contact with the polyol, links or binds the polyol into a polymeric structure by reacting with the hydroxyl groups to produce urethane units, carbon dioxide, and water. The reaction normally proceeds rapidly and therefore the reactants must be thoroughly blended very quickly to insure a uniform product. A pre-polymer or semi-prepolymer may be formed by reacting about 20% or less of the polyol with the entire amount of the isocyanate. Subsequently the prepolymer may be mixed at the site with the balance of the polyol and the reaction allowed to go to completion. The total heat of reaction, which may be in excess of 300° F. if all of both components are allowed to react at one time, is thereby spread over two reaction periods.

Catalysts, such as metal salts and amines including stannous octoate, stannous chloride, dibutyl tin laurate and triethylenediamine may be used to control the gelling and polymerization phases of the foam producing process and also the aerating process in reactively blown foams.

Mechanical, physical or chemical means such as beaters, compressed gases, liquids which volatilize at the reaction temperatures, and the interaction of chemical components may be used as aerating or foaming agents to entrain gaseous bubbles in the plastic mass. The preferred aerating agent is an easily handled, readily controlled,

non-toxic, non-corrosive, non-flammable agent which may be soluble or dispersible in the plastic foam components. Physical aerating means may include compressed gases, light hydrocarbons, halogenated hydrocarbons and fluorocarbons, such as nitrogen, nitrous oxide, and carbon dioxide, pentane, heptane, toluene, methyl chloride, trichlorotrifluoroethane, and the like. The chemical reaction of the excess isocyanate with the water formed during the polymerization process also produces carbon dioxide. Other chemical aerating agents such as azobisformamide, N,N'-dimethyl-N,N'-dinitrosotereph - thalamide, toluene-(4)-sulfonyl hydrazide, and the like may be used. Two or more aerating agents may be used to expand the plastic ingredients at successive time intervals or in overlapping stages. The first stage is a partial expansion which may have a cooling and retarding effect on the chemical reaction between the foam components. A later stage may then complete the expansion of the components. This method generally results in a more uniform foam especially in high rise applications such as in the narrow vertical foam chambers **140** of this invention. Since the final volume of the foam may exceed thirty times the initial volume of its components, pressures having an order of magnitude from three to five pounds per square inch may be developed when expansion occurs in a short interval of time. Multiple stage expansion when part of the total expansion takes place outside the chamber **140** may substantially reduce the expansive force of the foam on the chamber walls.

The resultant foam may contain a wide variety of cell sizes and shapes ranging from large to small and from closed cell to reticulated or weblike structures. The characteristic size, shape and the uniformity of the cells or pores may be controlled in part by the addition of wetting agents or non-ionic and anionic surface active agents which reduce and equalize surface tension and promote bubble or cell formation. The silicone polymers, such as dimethyl polysiloxane when used in concentrations from about .25 to 1.0% by weight produce a relatively uniform fine cell structure particularly in the lower density urethane foams. The percentage of closed cells may substantially exceed 80% and provide insulative properties including resistance to permeation by air and moisture. The surface active agents may also have some nucleating effect, but nucleating agents including carbon black, talc, or the like, may be added to produce more celle per unit volume of entrained gas.

The expanded plastic foam **40** is protected from exposure to direct flame by the casement type frame **65, 95, 125** and the surfaces of the wall **20** which substantially enclose the foam except at the small juncture crevices where the frame abuts the wall **20**. In applications requiring additional flame protection, non-reactive and reactive flame retardants, such as antimony trioxide, compounds of phosphorus, halogen compounds and combinations thereof; including tris betachloroethyl phosphate, tris (dichloropropyl) phosphate, and tris (dibromopropyl) phosphate, may be added to the foam formulation in amounts from about 5 to 20%.

Improved dimensional stability may be imparted to the foam by the addition of reinforcing fillers such as natural and synthetic particles and fibers including wood flour, glass fibers and metal flakes.

Many of the above-mentioned ingredients of foam formulations are polyfunctional and yet only one function, usually the primary function, thereof was mentioned. For instance, trichlorofluoromethane may function as a solvent which reduces the viscosity of the polyol and yet it was discussed primarily as an aerating means. For the sake of brevity we have not exhaustively treated all functional foam formulations.

Method

A structural wall **20** with an opening therein may be erected with available construction materials, such as wood, plaster, masonry blocks, concrete, or the like. A frame **65, 95** or **125** may then be assembled in the opening and made plumb and also made square if it is a rectangular frame. Means such as the removable brace **82** or the shimmed closure **62**, etc. for holding and bracing the frame in position may then be secured. If a heat expandable plastic material has been applied to one or more of the chamber forming surfaces and the frame **65, 95** or **125** interiorly carries a chamber seal means **180**, then radiant or direct heat may be applied to the chamber **140** which causes the fused or fusible ingredients to flow and be expanded by self-contained heat responsive aerating means. The material is allowed to expand to the limit of the sealed chamber **140** and flow into the interstices of the surfaces of the frame **65, 95** or **125** and the peripheral edge of the rough opening. Then the expanded plastic material is allowed to set and form a seamless cellular mass which mechanically and adhesively anchors the frame **65, 95** or **125** to the wall **20**. When the frame **65, 95** or **125** does not interiorly carry a chamber seal **180** an exterior chamber seal means **144, 145, 155, 165** or **176** may be applied prior to the complete expansion of the anchoring material. When the expandable anchoring material is to be induced into the chamber **140** after assembly of the frame **65, 95** or **125** in the opening, it may be forced or poured into the chamber **140** through inlet holes **142** around the peripheral edges of the frame **65, 95** or **125**. The inlet holes **142** may act as gauges and may be spaced from the base of the frame so that when the chamber is filled level with the hole, injection of the material may be stopped and the inlet hole **142** plugged because then sufficient expandable material has been introduced to further expand to fill the chamber **140**.

The expandable material may be a foam formulation prepared in accordance with the teachings set forth in Patent No. 3,072,582 issued to Charles Bedell Frost, or a flame retardant foam formulation such as described in Patent No. 3,134,742 issued to Marco Wismer, Louis Le Bras and John R. Peffer may be used for anchoring the frame **65, 95** or **125** to a rough opening. The unreacted or partially reacted ingredients may be mixed in appropriate proportions in a metering and blending apparatus **190** (see FIG. 17) which also may control the temperature of the entering materials. This apparatus may be portable or mounted on a cart for movement around the floors of a building to each opening to be framed. The expandable material may then be conveyed under pressure from the blending section of the apparatus to the inlet holes **142** through a hose or pipe **192** the tip of which may be inserted into the inlet holes. The expandable material is allowed to rise and fill the chamber **140** to its limits and subsequently set to form a firm cellular plastic mass **40** which provides interior backing and support to the frame **65, 95** or **125** and anchors it to the wall **20**. In the event the expanding material does not completely fill the chamber, more expandable material may be added into one or more of the holes **142** at the top of the frame **65, 95** or **125**.

While there is described above the principles of this invention in connection with specific apparatus, it is to be clearly understood that this desciption is made only by way of example and not as a limitation to the scope of this invention.

What is claimed is:

1. A method of anchoring a frame in an opening in a wall comprising:

(1) providing a chamber between the frame and the edge of the opening in the wall, and a seal for said chamber between the edges of said frame and the wall adjacent said opening,

(2) placing an expandable plastic material in said chamber, and

(3) expanding said plastic material in situ in said chamber to fill said chamber and anchor said frame to said wall in said opening.

2. A method according to claim **1** wherein the wall is

a masonry wall and the edges of the opening therein have a rough texture.

3. A method according to claim 1 wherein the chamber is sealed at the juncture between the frame and the wall edges by a resilient seal.

4. A method according to claim 1 wherein the expanded plastic material is a cellular mass formed from a thermosetting plastic which bonds to the edges of the wall opening and to the frame.

5. A method according to claim 1 wherein the seal is a resilient strip attached to the interior edges of said frame.

6. A method according to claim 1 wherein the seal is an exterior seal removably held over the crevice between the wall and the frame.

7. A method according to claim 1 wherein said frame is an unassembled prefabricated frame having a U-shaped channel for engaging the wall adjacent the edges of said opening, and the erection of said frame includes bracing said frame against the force of expansion of said expandable plastic material.

8. A method according to claim 1 wherein inlet holes are provided in said frame for the induction of the expandable plastic material into the chamber.

9. A method according to claim 1 including bracing said frame in said opening against the expansive force of the expandable plastic material.

10. A method for anchoring a prefabricated casement in a wall opening comprising:

(1) erecting the casement in the opening, which casement has a U-shaped channel for forming a chamber by closing the open ends of the channel with the abutting edges of the wall,

(2) applying a seal between the surface of the wall and the casement,

(3) placing an expandable plastic material in the chamber between the casement and the wall, and

(4) causing the plastic to expand and set.

11. A method according to claim 10 wherein erecting the casement includes bracing it against the expansive force of the expandable plastic.

12. A method for anchoring a prefabricated casement in a wall opening comprising:

(1) placing an expandable plastic material on at least one of the interior surfaces of the casement,

(2) forming a chamber around the wall opening by erecting the casement in the opening which casement has a U-shaped channel, the base of which channel is spaced from the wall edges and the open ends of which channel abut the wall surfaces adjacent the wall opening,

(3) applying an interior seal between the surface of the wall and the casement, and

(4) causing the plastic to expand and set.

13. A method for anchoring a prefabricated casement in a wall opening comprising:

(1) applying a resilient seal to the interior of the casement adjacent its line of juncture with the surfaces of the wall opening,

(2) placing an expandable plastic material on at least one of the interior surfaces of the casement,

(3) erecting the casement in the opening, which casement has a U-shaped channel for forming a chamber when the open ends of the channel abut the edges of the wall adjacent the opening, and

(4) causing the plastic to expand and set.

14. A method for anchoring a prefabricated casement in a wall opening comprising:

(1) erecting the casement in the opening, which casement has a U-shaped channel for forming a chamber by closing the open ends of the channel with the abutting edges of the wall,

(2) placing an expandable plastic in the chamber between the casement and the wall,

(3) applying an exterior seal between the surface of the wall and the casement, and

(4) causing the plastic to expand and set.

15. A method for anchoring a frame in a wall opening comprising:

(1) placing an expandable plastic on at least a portion of the peripheral edge of the wall opening,

(2) erecting the frame in the opening, which frame has a U-shaped channel for forming a chamber by closing the open ends of the channel with the abutting edges of the wall.

(3) applying an exterior seal between the surface of the wall and the casement, and

(4) causing the plastic to expand and set.

References Cited

UNITED STATES PATENTS

2,289,558	7/1942	Thompson	52—213 X
3,250,041	5/1966	Anger	52—615 X

KENNETH DOWNEY, *Primary Examiner.*