

Sep. 6, 2007

[illegible]

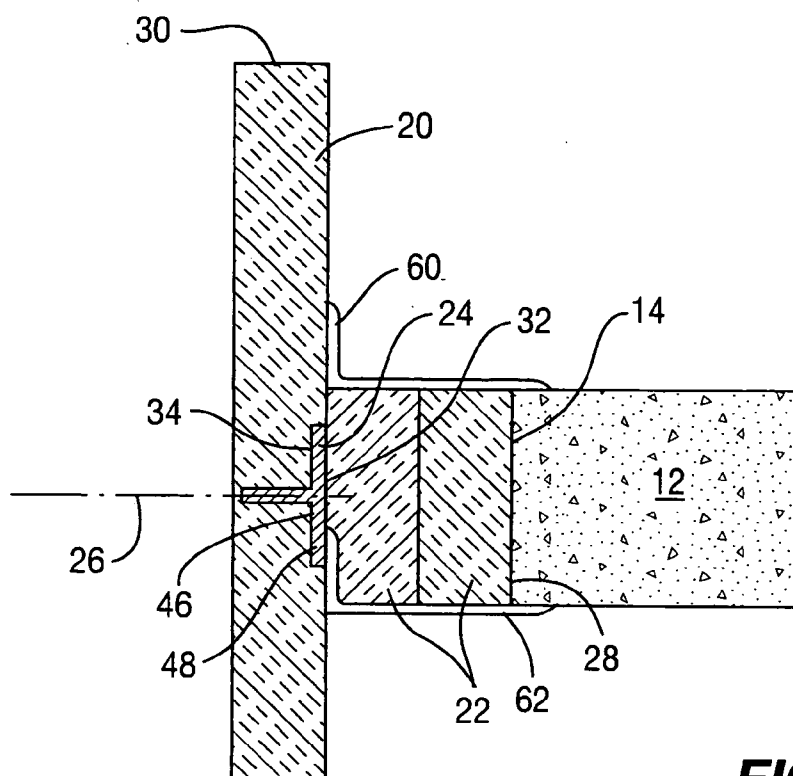


FIG. 1

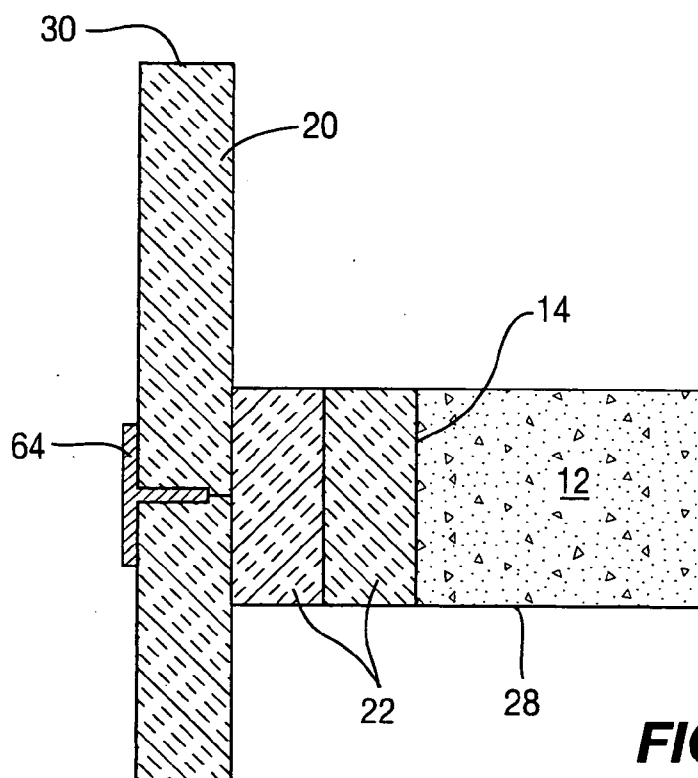


FIG. 7
PRIOR ART

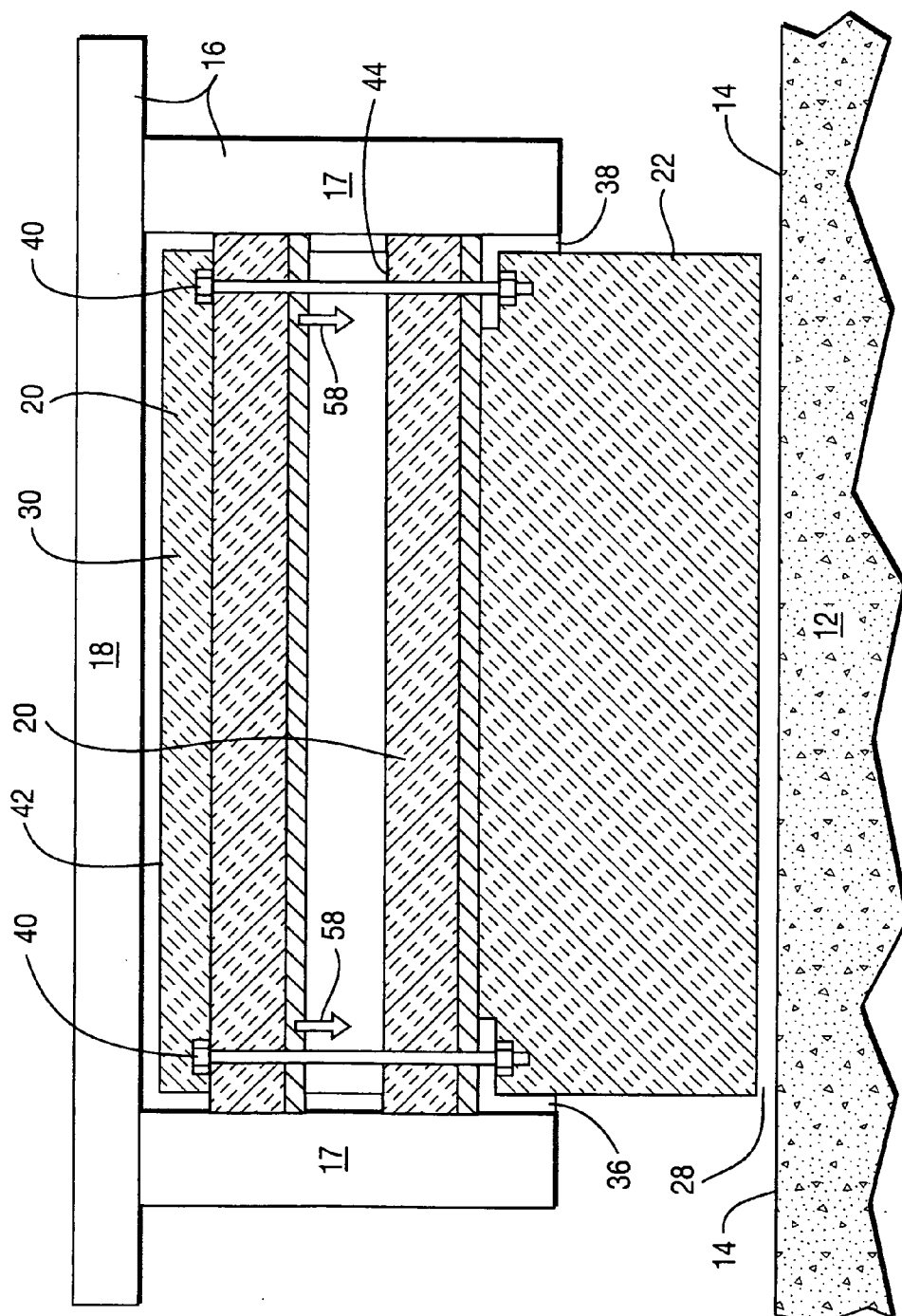


FIG. 2

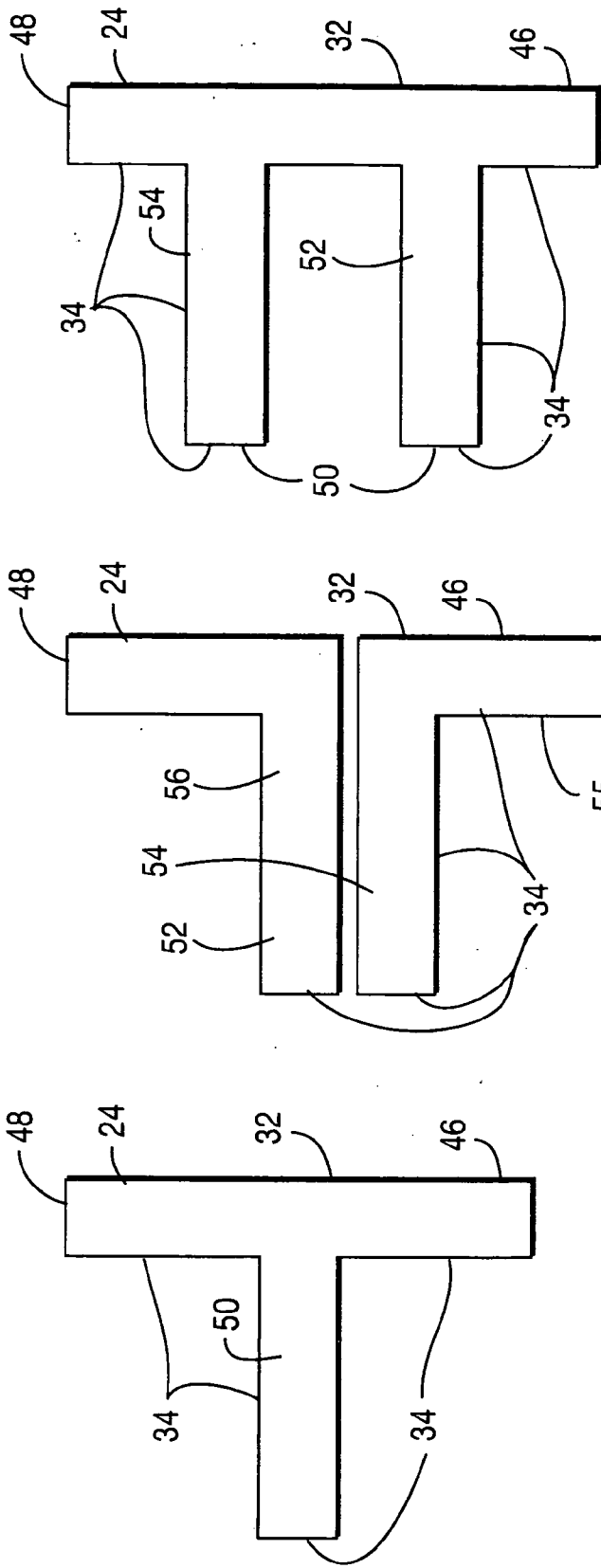


FIG. 3

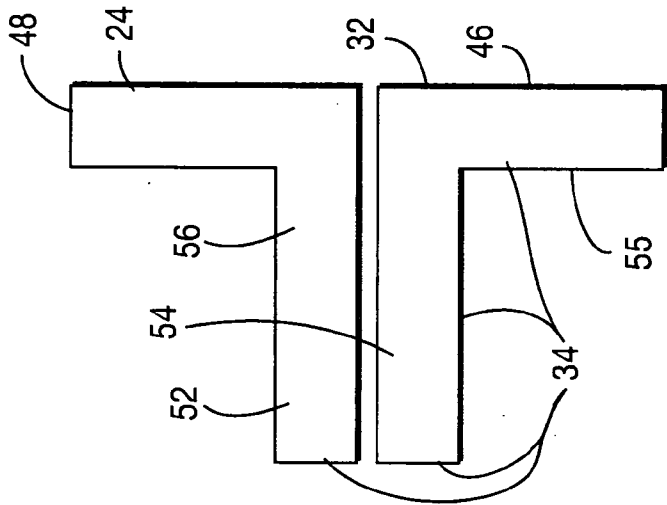


FIG. 4

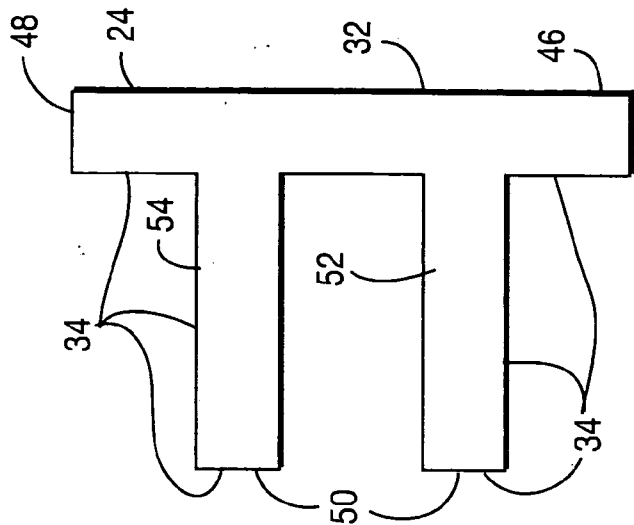


FIG. 5

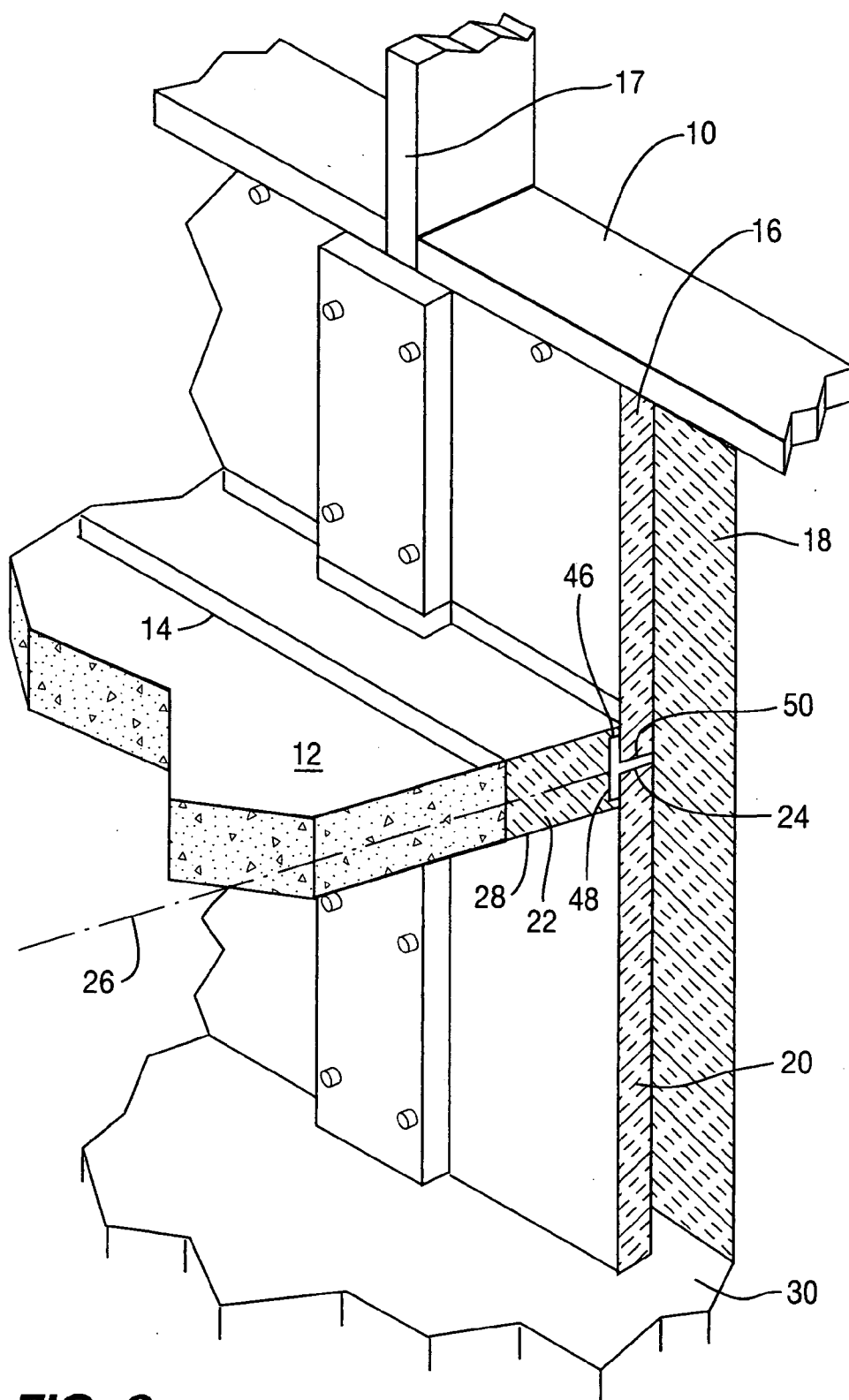


FIG. 6

MEANS AND METHOD FOR FIREPROOF SEALING BETWEEN THE PERIPHERAL EDGE OF INDIVIDUAL FLOORS OF A BUILDING AND THE EXTERIOR WALL STRUCTURE THEREOF

BACKGROUND OF THE INVENTION

[0001] 1. Field Of The Invention

[0002] The present invention deals with a field of devices for providing a means of sealing the perimeter joint or slot defined between a normally conventional concrete floor, and the exterior wall construction of a building. It is necessary to make a seal in this slot for the purposes of minimizing the flow of smoke, fire or heat from one floor upwardly to the floor immediately thereabove. Such seal, often defined as a smoke seal, is designed to seal the flow of any hot gases also. Each floor is deemed to be a separate zone, and it is desirable that all fire, smoke, heat and hot gases be contained or compartmentalized within each area to prevent spreading to an adjacent area to minimize spreading of the fire. In this manner, a maximum amount of time is given for individuals to exit the building after a fire starts, and also it maximizes the chance for fire personnel to treat the fire prior to spreading thereof to multiple floors.

[0003] It is common to place stiffeners or T-shaped stiffening metallic members around the safing line or plane of the floors in order to firmly hold insulation between the floor and the outer cladding. Normally, this insulation includes a safing insulation which is positioned immediately around the outer periphery of the floor, and is normally of a mineral wall material, and is compressed prior to placement. This safing insulation is normally in abutment with the spandrel insulation which extends vertically in a conventional manner between vertically extending members such as aluminum mullions, and positioned immediately inside of the outer spandrel panels or outer cladding of the building. A stiffening member is normally secured in position extending between the vertically extending members across the surface of the spandrel panel, such as to exert inwardly directed bias against the spandrel insulation, or more particularly, against the safing insulation for maintaining it in place and achieving an effective perimeter seal of the slot between the floor and the outer construction of the building. The present invention provides a unique construction wherein an additional stiffening member is included positioned immediately adjacent to the safing insulation while maintaining compression thereof, or, where the outer stiffening member is repositioned at a location inside of the spandrel insulation, rather than outside of the spandrel insulation, such that it can more effectively achieve the desired compression of the safing insulation, while at the same time, allowing the spandrel insulation and the safing insulation to provide fireproofing protection for the reinforcing member itself. This member can take various constructions or configurations as shown herein.

[0004] 2. Description Of The Prior Art

[0005] Many prior art devices have been utilized for perimeter sealing of floors within buildings for prevention of the movement of hot gases, smoke, fire, or heat from one floor to another such as shown in U.S. Pat. No. 3,110,131 patented Nov. 12, 1963 to T. N. Jeffress and assigned to Jeffress-Dyer, Inc. on a "Building Construction"; and U.S. Pat. No. 3,319,388 patented May 16, 1967 to T. K. Olsen on

"Wall Constructions"; and U.S. Pat. No. 3,357,144 patented to P. A. Chauveau et al on Dec. 12, 1967 and assigned to Constructions Metalliques Fillod S. A. on "External Sheathing Or Curtain Wall"; and U.S. Pat. No. 3,950,906 patented Apr. 20, 1976 to S. Mollinger on a "Flexible Curtain Wall"; and U.S. Pat. No. 3,994,107 patented Nov. 30, 1976 to A. Aughuet and assigned to Applications de la Chimie, de l'Electricite et des Metaux, en abregé "SADACEM" on a "Curtain Wall Structure"; and U.S. Pat. No. 4,221,095 patented Sep. 9, 1980 to R. N. Weinart on "Wall Constructed From Wallboard Held Together With Concealed Fasteners"; and U.S. Pat. No. 4,449,341 patented May 22, 1984 to P. C. Taglianetti et al and assigned to PPG Industries, Inc. on a "Fire Containment Arrangement For Curtain Wall Construction"; and U.S. Pat. No. 4,531,332 patented Jul. 30, 1985 to E. Gartner and assigned to Yoshida Kogyo K. K. on a "Rooftop Parapet For Thermally-Insulated Curtain Wall"; and U.S. Pat. No. 4,608,793 patented Sep. 2, 1986 to W. R. Yost et al and assigned to Cadillac Rubber & Plastics, Inc. on a "Structural Gasket Wall"; and U.S. Pat. No. 4,610,115 patented Sep. 9, 1986 to A. E. Thompson, Jr. and assigned to PPG Industries, Inc. on a "Multiple-Glazed Combination Vision And Spandrel Architectural Panel And Curtainwall"; and U.S. Pat. No. 4,974,380 patented Dec. 4, 1990 to K. G. Bemander et al on "Framing For Structural Walls In Multistory Buildings"; and U.S. Pat. No. 5,355,645 patented Oct. 18, 1994 to F. A. Farag on a "Stopless Butt-Joint Multiple Curtainwall System"; and U.S. Pat. No. 5,402,612 patented Apr. 4, 1995 to E. R. diGirolamo et al on a "Structural System For Supporting A Building Utilizing Light Weight Steel Framing For Walls And Hollow Core Concrete Slabs For Floors"; and U.S. Pat. No. 5,502,937 patented Apr. 2, 1996 to V. H. Wilson and assigned to Minnesota Mining And Manufacturing Company on a "Fire Protective Flexible Composite Insulating System"; and U.S. Pat. No. 5,729,936 patented Mar. 24, 1998 to J. F. Maxwell on a "Prefab Fiber Building Construction"; and U.S. Pat. No. 5,761,873 patented Jun. 9, 1998 to J. Slater on a "Web, Beam And Frame System For A Building Structure"; and U.S. Pat. No. 5,765,332 patented to H. V. Landin et al on Jun. 16, 1998 and assigned to Minnesota Mining And Manufacturing Company on a "Fire Barrier Protected Dynamic Joint"; and U.S. Pat. No. 5,913,788 patented Jun. 22, 1999 to T. R. Herren on a "Fire Blocking And Seismic Resistant Wall Structure"; and U.S. Pat. No. 5,950,385 patented Sep. 14, 1999 to T. R. Herren on an "Interior Shaft Wall Construction"; and U.S. Pat. No. 6,041,561 patented Mar. 28, 2000 to D. LeBlang and assigned to Wayne LeBlang on a "Self-Contained Molded Pre-Fabricated Building Panel And Method Of Making The Same"; and U.S. Pat. No. 6,058,668 patented May 9, 2000 to T. R. Herren on a "Seismic And Fire-Resistant Head-Of-Wall Structure"; and U.S. Pat. No. 6,381,913 patented May 7, 2002 to R. R. Herren on a "Stud For Construction Of Seismic And Fire Resistant Shaft Walls"; and U.S. Pat. No. 6,857,233 patented Feb. 22, 2005 to R. A. Farag on a "Fire Resistant Rated Fenestration, Including Curtain Wall Systems, For Multiple Story Buildings"; and U.S. Pat. No. 6,935,077 patented Aug. 30, 2005 to H. Wulfert et al on an "Earthquake-Immune Curtain Wall System".

SUMMARY OF THE INVENTION

[0006] The present invention provides a means for fireproof sealing between the peripheral edges of a floor of a

building and the external wall structure thereof. Such an exterior wall structure normally includes multiple vertically extending wall members which can include aluminum mullions which extend vertically therewithin, and are laterally spaced apart. Spandrel panels extend therebetween to provide an exterior cladding to the building, and spandrel insulation extends vertically in sections between the spandrel panels. The present invention provides a unique means for fireproof sealing by providing the positioning of safing insulation in abutment with the peripheral edge of an adjacent floor, and also an insulation support member attached with respect to, and extending between the wall members at a position coplanar to the floor structure or along the safing line. The insulation support member is designed to be positioned spatially disposed from the spandrel panels of the exterior wall. This insulation support member is also positioned spatially positioned from the peripheral edge of the floor to define therebetween a safing insulation retaining zone to facilitate holding and retaining of the safing insulation therein by being positioned in abutment therewith for fireproof sealing between the insulation support member and the peripheral edge of the adjacent wall. Preferably, the insulation support member includes a safing abutment surface facing inwardly toward the peripheral edge of the individual floor which is adapted to abut the safing insulation positioned immediately thereadjacent within the safing insulation retaining zone. The insulation support member is also preferably positioned spatially disposed from the spandrel panels of the exterior wall for the purpose of finding a spandrel insulation retaining zone thereadjacent to facilitate holding and retaining of that spandrel insulation therewithin positioned between the insulation support member and the spandrel panels laterally between adjacently positioned vertically extending wall members.

[0007] A portion of the insulation support member immediately adjacent to the spandrel insulation retaining zone is defined as the spandrel abutment surface. Preferably, the insulation support member is secured directly with respect to the wall members and extending therebetween, or alternatively, can be secured to mounting brackets which themselves are mounted with respect to the wall members to provide the means for attachment of the insulation support member to the vertically extending wall members. One means for attaching of the insulation support member to the mounting brackets can include member mounting screws. This positioning of the insulation support member immediately outside of the safing insulation and in abutment therewith, facilitates the compression of the safing insulation about the perimeter edge of the floor. Normally, such safing insulation comprises mineral wool which needs to be compressed prior to installation to increase the effectiveness of fireproof sealing therewith. The positioning of the insulation support member immediately adjacent to the safing insulation, provides a firm surface on one end of the safing insulation retaining zone, and the outer edge of the floor provides another firm edge such that when the safing insulation is compressed and placed between these two members, it is maintained in place. This is a distinct improvement in fireproofing characteristics made possible only by the positioning of the insulation support member immediately adjacent to the safing insulation and the safing insulation retaining zone within which it is placed.

[0008] Furthermore, the positioning of the insulation support member sandwiched between the safing insulation and

the spandrel insulation, provides protection to the insulation support member not present in prior constructions. It should be appreciated that the insulation support member is a very important characteristic in the overall maintenance of structural integrity of the insulation structure between the wall and the exterior wall structure. If the insulation support member becomes overheated, it may tend to bend or warp which could severely compromise the positioning of the safing insulation, or it could also possibly compromise the positioning of the spandrel insulation. This would allow portions of the slot between the floor and the exterior cladding to become open and severely compromise the fireproofing characteristics surrounding the particular floor. Thus, it can be seen that it is very important that excessive heat not be brought in contact with the insulation support member, and the achieving of this desired end is maximized by sandwiching the insulation support member between the interior safing insulation and the exteriorly positioned spandrel insulation.

[0009] Compression of the safing insulation can also be uniquely controlled by an improved method for installation of the insulation support member with the use of member mounting screws. The insulation support member is initially placed at an outwardly extended position from the desired final location with screws extending therethrough and engaged with respect to the vertically extending wall members, or with respect to mounting brackets secured to the vertically extending wall member. Thus, with this positioning, the distance between the outer edge of the floor, and the insulation support member, will be greater than the final positioning thereof. This relationship occurs because the tightening of the member mounting screws will draw the insulation support member inwardly toward the peripheral edge of the floor until it reaches its final desired mounting position, at which time it is finally secured.

[0010] By placing the insulation support member at the initial position after partial installation and prior to full installation, would allow the placement of safing insulation between the position of the insulation support member and the outer peripheral edge of the flooring. Thus tightening of the member mount screws would achieve a dual purpose of firstly urging the insulation member inwardly toward the floor towards its final securement position, while at the same time compressing of the safing insulation surrounding the floor edge. This dual purpose is important since compression of the safing insulation is often difficult to perform in the field. Also, if the safing insulation is compressed prior to placement between the edge of the floor and the initial positioning of the insulation support member prior to tightening of the screws, then the final installation of the insulation support member by tightening of the member mounting screws, will allow compression of the mineral wool to a degree greater than possible for an individual technician in the field. Such a technician could compress the mineral wool to the maximum extent possible, and place it between the initial position of the support member and the outer edge of the floor, and then its compression achieved by tightening of the member mounting screws would achieve a compression level greater than the maximum amount of compression achievable by the particular installation technician.

[0011] The configuration of the insulation support member can be of various constructions. However, it preferably includes a safing abutment surface for abutting the safing

retaining zone, and holding the mineral wall in place. It also must preferably include a spandrel abutment surface for abutting a spandrel insulation zone on the exterior thereof. Such designs commonly can be T-shaped, and are often formed by putting two angle iron members back to back to form an overall T-structure, having a generally flat extending top portion, and a body portion of double strength. Normally, the flat portion of the upper portion of the T, or the top portion thereof, will face inwardly toward the safing retaining zone in order to define the safing abutment surface. With this construction, preferably the lower double strength body section will face outwardly toward the spandrel insulation, and provide the spandrel abutment surface, or spandrel abutment edge thereof. Other configurations are possible including a double strength body portion which is spaced apart, and is in the general shape of a "hat".

[0012] It is an object of the present invention to provide a means and method for fireproof sealing between the peripheral edges of individual floors of a building and the exterior wall structure thereof, wherein the perimeter zone of the floor is sealed with an approved material that extends the rating of the exterior wall surface, which provides structural protection and maximizes the integrity of the wall system.

[0013] It is an object of the present invention to provide a means and method for fireproofing sealing between the peripheral edges of individual floors of a building and the exterior wall structure thereof, wherein the perimeter zone of the floor is sealed with an approved material that extends the rating of the exterior wall surface, which prevents the migration of flame, hot gases, smoke and heat through to the floors thereabove.

[0014] It is an object of the present invention to provide a means and method for fireproof sealing between the peripheral edges of individual floors of a building and the exterior wall structure thereof, wherein the perimeter zone of the floor is sealed with an approved material that extends the rating of the exterior wall surface which provides significant protection in case of a malfunction of other fire protection systems, such as sprinklers or detection alarms.

[0015] It is an object of the present invention to provide a means and method for fireproof sealing between the peripheral edges of individual floors of a building and the exterior wall structure thereof, wherein the perimeter zone of the floor is sealed with an approved material that extends the rating of the exterior wall surface which provides additional time for fire personnel to reach the building for terminating the fire problem.

[0016] It is an object of the present invention to provide a means and method for fireproof sealing between the peripheral edges of individual floors of a building and the exterior wall structure thereof, wherein the perimeter zone of the floor is sealed with an approved material that extends the rating of the exterior wall surface which provides additional time to allow the occupants of a building to escape after the start of a fire.

[0017] It is an object of the present invention to provide a means and method for fireproof sealing between the peripheral edges of individual floors of a building and the exterior wall structure thereof, wherein the perimeter zone of the floor is sealed with an approved material that extends the rating of the exterior wall surface which protects the structural elements of a building, and helps prevent failure of the exterior wall construction.

[0018] It is an object of the present invention to provide a means and method for fireproof sealing between the peripheral edges of individual floors of a building and the exterior wall structure thereof, wherein the perimeter zone of the floor is sealed with an approved material that extends the rating of the exterior wall surface which enhances fire protection even in those applications where it is adjacent to a wall which is not fire rated.

[0019] It is an object of the present invention to provide a means and method for fireproof sealing between the peripheral edges of individual floors of a building and the exterior wall structure thereof, wherein the perimeter zone of the floor is sealed with an approved material that extends the rating of the exterior wall surface which provides a means for protecting the insulation support members which further facilitates maintenance of the integrity of the spandrel insulation and the safing insulation about the floor periphery.

[0020] It is an object of the present invention to provide a means and method for fireproof sealing between the peripheral edges of individual floors of a building and the exterior wall structure thereof, wherein the perimeter zone of the floor is sealed with an approved material that extends the rating of the exterior wall surface which can be conventionally formed by steel angles which are doubled back to back.

[0021] It is an object of the present invention to provide a means and method for fireproof sealing between the peripheral edges of individual floors of a building and the exterior wall structure thereof, wherein the perimeter zone of the floor is sealed with an approved material that extends the rating of the exterior wall surface which can be used to maintain the desired compression of the safing insulation.

[0022] It is an object of the present invention to provide a means and method for fireproof sealing between the peripheral edges of individual floors of a building and the exterior wall structure thereof, wherein the perimeter zone of the floor is sealed with an approved material that extends the rating of the exterior wall surface which can be utilized to provide additional compression to the safing insulation during the installation process of the insulation member itself.

[0023] It is an object of the present invention to provide a means and method for fireproof sealing between the peripheral edges of individual floors of a building and the exterior wall structure thereof, wherein the perimeter zone of the floor is sealed with an approved material that extends the rating of the exterior wall surface which prevents overheating of the safing stiffening means.

[0024] It is an object of the present invention to provide a means and method for fireproof sealing between the peripheral edges of individual floors of a building and the exterior wall structure thereof, wherein the perimeter zone of the floor is sealed with an approved material that extends the rating of the exterior wall surface which prevents outer deflection of the safing stiffening means.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025] While the invention is particularly pointed out and distinctly claimed in the concluding portions herein, a preferred embodiment is set forth in the following detailed description which may be best understood when read in connection with the accompanying drawings, in which:

[0026] FIG. 1 is an illustration of an embodiment of the means for fireproof sealing of the present invention showing cross-section extending between the edge of the floor and the spandrel insulation;

[0027] FIG. 2 is a top plan view of an embodiment of a means for fireproof sealing of the present invention showing use with mounting brackets and with screws for tightening the insulation support member from an initial position to a final position for mounting thereof and for compressing of the safing insulation;

[0028] FIG. 3 is an embodiment of the cross-sectional shape of the insulation support member;

[0029] FIG. 4 is another embodiment of a possible cross-sectional shape of the insulation support member of the present invention;

[0030] FIG. 5 is another alternative embodiment of the cross-sectional shape of the insulation support member of the present invention;

[0031] FIG. 6 is a prospective illustration showing an embodiment of the insulation support member of the present invention positioned between the peripheral edge of a floor and an exterior wall; and

[0032] FIG. 7 is a cross-sectional view similar to FIG. 1 showing the positioning of the stiff back angle of the prior art at a location outside of the spandrel insulation.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0033] The present invention provides an improved means and method for providing a fireproofing seal within a building 10 about the individual floors 12 thereof, and particularly, about the outer peripheral edges 14 of these floors 12. A seal fireproofing seal needs to be provided between the exterior wall structure 16 and the peripheral edges 14 of the floor 12 in order to prevent the movement of hot gases, fire, smoke and heat upwardly therethrough in order to prevent fire from spreading upwardly within a building by maintaining compartmentalization of the building and of the fire located within a particular floor therein. The exterior wall structure 16 of the conventional building includes vertically extending wall members 17 which can comprise studs of wood or metal often in commercial buildings formed of aluminum. These vertical wall members 17 are spaced apart from one another, and spandrel panels 18 are secured extending thereover normally used as a portion of the exterior cladding of the building. Spandrel insulation 20 is then normally positioned in vertically extending sections running up and down along the inside surface of each spandrel panel 18 between adjacent or positioned vertical wall members 17 for achieving basic building insulation.

[0034] Additional insulation is now required near the positioning of the spandrel insulation 20 surrounding each individual floor 10 by a floor 12 at the plane 26 of each floor construction. Safing insulation 22 is positioned about the outermost peripheral edge 14 thereof. This safing insulation provides fireproof protection between the floor edge 14 and the exterior wall structure 16, in addition to the spandrel insulation 20, to prevent fire from moving from one floor to the floor immediately thereabove by moving through a slot or joint which would otherwise be defined outside of the

outer peripheral edge 14 of such floors 12. Most of such floors 12 according to this design are of concrete material and provide sufficient fire sealing, but the peripheral edge is a weak point, and for this reason, the positioning of the safing insulation 22 surrounding the floor edges 14 has become a requirement in multiple floor buildings.

[0035] A conventional design for this is shown in FIG. 7 as a prior art design, wherein a standard stiffener 64 is shown positioned outside of the spandrel insulation connected to an adjacently positioned vertically extending wall members to provide a means for firmly exerting lateral pressure inwardly on the safing insulation 22 for compressing thereof for enhancing its positioning and the maintenance of positioning responsive to heating conditions and the compression thereof to further achieve an active fireproofing seal.

[0036] The present invention provides a unique improvement over this design by adding an insulation support member 24 positioned between the safing insulation 22 and the spandrel insulation 20. This unique position of the insulation support member 24 can be an addition to, but is preferably a replacement for the positioning of the standard stiffener placement location 64 shown in FIG. 7. In the preferred embodiment of the present invention, the standard stiffener 64 is not utilized and is replaced by a positioning of an insulation support member 24 as shown best in FIG. 1 wherein it is sandwiched between the spandrel insulation 20 and the safing insulation 22.

[0037] The insulation support member 24 is attached as shown in FIG. 2 to adjacently positioned vertically extending wall member 17. This attachment can be directly to the wall member 17, or can be through brackets 36 and 38. The first mounting bracket 36 is mounted with respect to one vertically extending member 17, and the second mounting bracket 38 is positioned with respect to a second adjacent but spatially disposed vertically extending member 17. The mounting brackets 36 and 38 provides a means for attachment of the insulation support member 24 extending between vertically extending member 17 further inwardly within the building construction which affords distinct advantages over the standard placement shown in FIG. 7. In practice, the same T-shaped insulation support member 46 can be utilized as is utilized in the current conventional construction method shown in FIG. 7, however, it is reversed and moved inside of the spandrel insulation 20, rather than being positioned between the spandrel insulation 20 and the spandrel panels 18. This unique placement affords several distinct advantages described below.

[0038] Safing insulation is designed to be placed within a safing insulation retaining zone 28 defined between a safing abutment surface 32 defined on the insulation support member 24, and the peripheral edge 14 of floor 12. In a similar manner, the insulation support member 24 will preferably include a spandrel abutment surface or edge or combination thereof 34 which defines a spandrel insulation retaining zone 30 between it and the spandrel panel 18 immediately located outboard thereof within the exterior wall structure 16.

[0039] Positioning of the insulation support member 24 can be secured by member mounting screws 40. These screws are shown best in FIG. 2, and can be used for attaching the insulation support member 24 to the mounting brackets 36 and 38, or directly with respect to the vertically extending wall members 17. Thus, tightening of member

mounting screws 40 will move the insulation support member 24 from the initial position 42 downwardly as shown in FIG. 2, or inwardly toward the floor 12, toward a final mounting position 44. This movement can be utilized as described below to enhance the compression of the safing insulation 22.

[0040] It should be appreciated that the construction of the insulation support member 24 can be of any chosen design as long as it is attached with respect to the vertically extending wall members and provides a safing insulation abutment surface. However, it would be convenient certainly to utilize the same basic construction as currently being utilized for the stiffback angle of the prior art as shown in FIG. 7 of the present invention. Thus, by utilizing the same exact hardware and reversing the positioning thereof and moving it inwardly to a position between the safing insulation 22 and the spandrel insulation 20, the desired end is achieved. It is also possible that the insulation support member 24 could maintain the same orientation or any other orientation when positioned between the two insulations as long as it includes a surface or edge which can be defined as the safing abutment surface 32. With any of these configurations it will exert an outermost border which is immovable such that the safing insulation retaining zone 28 will be fixedly defined thereby allowing insertion of the safing insulation 22 therein to be fully retained even when exposed to fire conditions and also when positioned in this zone in a compressed state.

[0041] Examples of the possible configurations for the insulation support member 24 are shown in FIGS. 3, 4 and 5 of the present invention. FIG. 3 shows a standard T-shaped insulation support member 46 with a top or upper section 48 and a body or lower section 50. FIG. 2 shows an alternative configuration which is also generally T-shaped but is formed by positioning two separate members having an L-shaped cross section positioned back to back with the non-contacting members extending away from one another. The overall configuration as shown in FIG. 4 is again a T-shaped support member 46 however it includes a first body member 52 and a second body member 54 which are in abutment with respect to one another to provide increased stiffening along the body section 50 of the T-shaped insulation support member 46. This combination is formed by back to back abutment of a first L-shaped angle member 55 and a second L-shaped angle member 56 in abutment with respect to one another as shown in FIG. 4.

[0042] Another alternative configuration is that as shown in FIG. 5 which can be described in cross section as of the design of a "hat" wherein the unit is formed as a single integral member and the first body member 52 and the second body member 54 are spaced apart from one another such that the lower portion of the T is of double strength and provided by two separate members spaced apart from one another. This is another conventional configuration also used in the prior art which is directly usable in the unique and improved method and construction of the present invention.

[0043] To enhance the overall fire sealing characteristics of the present invention a sealing membrane may be included extending over the safing insulation 22. Two different configurations for this sealing membrane are shown in FIG. 1. A first sealing membrane configuration 60 is shown attached to the upper surface of the floor 12 extending

outwardly generally horizontally over the safing insulation 22 and secured to the inner surface of the spandrel insulation 20. A second configuration for the membrane is shown as the second sealing membrane 62 extending from the lower surface of the floor 12 to which it is secured over the safing insulation 22 and inwardly between the safing insulation 22 and the spandrel insulation 20 to be secured directly with respect to the insulation support member 24. It should be appreciated that the use of such a sealing membrane 60 and/or 62 can be positioned over the upper surface of the safing insulation only or over the lower surface of the safing insulation only or both. Also either configuration is useful for the top and/or bottom where the outermost end of the membrane could be connected to the spandrel insulation or the insulation support member 24. It should be appreciated, of course, that the most effective positioning of the sealing membrane is extending from the lower edge of the floor 12 outwardly because this is the area which is subjected to the greatest degrading forces because of the nature of hot gases and flames and fire to attempt to move upwardly due to the increased temperature thereof.

[0044] The construction of the present invention has several particular advantages. The first primary advantage is in the providing of an insulation support member 24 which includes a safing abutment surface 32 immediately adjacent to the safing insulation retaining zone 28 which is adapted to receive safing insulation 22 placed therein. Such safing insulation is normally compressed and the maintaining of this compression over time and during the extreme conditions of exposure to a fire is a very important characteristic in maintaining the integrity of the fireproof sealing mechanism of the present invention. The material of the safing insulation 22 is often chosen to be mineral wool and this is compressed to an extent of as great as 25% or greater prior to insertion into the safing retention zone by installation personnel. The positioning of a firm safing abutment surface 32 provides a means for maintaining of the desired compression level of the safing insulation 22 to the maximum extent possible. This is achieved because the insulation support member 24 is attached to the vertically extending wall member 17 at a position immediately adjacent to where the safing insulation 22 is placed without any intermediate non-hard material such as spandrel insulation therebetween.

[0045] Another important advantage of the construction and method of the present invention is in protection of the insulation support member 24. It is important that this member not be compromised at any time because that would severely weaken the fireproofing seal formed about the peripheral edge 14 of the floors 12. As such, the positioning of the insulation support member sandwiched between the outer edge of the safing insulation and the inner edge of the spandrel insulation provides protection from fire not available in constructions conceived heretofore.

[0046] The compression of the material such as mineral wool of the safing insulation 22 is an important consideration in evaluating the effectiveness of the fireproofing about the peripheral edge 14 of a floor 12. Such safing insulation 22 is normally compressed by installation personnel prior to placement. The present invention, however, provides a means for achieving this compression or even achieving compression greater than possible manually by the installation personnel when utilizing the construction of the insulation support member 24 of the present invention. This can

be shown best in FIG. 2. FIG. 2 shows the insulation support member 24 at an initial installation position 42 with the screw members ready to extend therethrough and into engagement with the brackets 36 and 38 or the vertical wall members 17 for tightening thereof to move the insulation support member 24 downwardly to the final position 44. Thus, when the insulation support member 24 is at the initial position 42, it is more distant from the peripheral edge 14 of the floor 12.

[0047] It is possible for an installation technician to position the insulation support member 24 at the initial position 42 shown in FIG. 2. Thereafter the technician can place the safing insulation 22 in a compressed or non-compressed state into the area between the peripheral floor edge 14 and the initial position 42 of the insulation support member 24. Once the safing insulation 22 is fully placed thereafter the member mounting screws 40 can be tightened which causes the insulation support member 24 to move downwardly as shown in FIG. 2 toward the final position 44 and thereby effectively compressing the safing insulation 22 into the safing insulation retaining zone 30. Thus compression of the safing insulation 22 can be achieved without any manual compressing thereof by the installation technician. Alternatively, however, the installation technician could, for example, compress the safing insulation 22 as much as possible manually and then insert it into position between the peripheral edge 14 of the floor 12 and the initial position 42 of the insulation support member 24 and thereafter move insulation support member 24 from the initial position 42 to the final position 44 thereby achieving a compression level of the safing insulation 22 within the safing insulation retaining zone 28 which would not be possible solely by manual compression of the installation technician.

[0048] Therefore the present invention provides a unique means for sealing around the peripheral edge of the floors of buildings and inside of the exterior wall construction thereof which more effectively protects the insulation support member and the integrity of the safing insulation and the spandrel insulation while at the same time being achievable by utilizing a construction similar to the stiffback angle currently being commonly utilized as shown in FIG. 7. Thus the same actual parts could be utilized but with changes to the positioning and/or orientation thereof which would achieve significantly enhanced results not anticipated or appreciated prior to the invention set forth in this herewithin.

[0049] One of the unique advantages of the floor to wall insulation method and construction of the present invention is in the usefulness in reconstructing buildings which are damaged by high winds or exterior fires which could blow off or otherwise degrade the external fascia or cladding of a building. In areas hard hit by hurricanes and other exterior weather often the exterior panels or constructions such as the spandrel panels, the windows or other portions of the exterior wall structure are removed. Many times the spandrel insulation also is removed. The present invention provides a means for reconstructing the insulation by allowing the use of the insulation support member of the present invention to be positioned extending between adjacent vertically extending wall members and the positioning of safing insulation in the area between the safing facing surface of the insulation member and the peripheral edge of the floor. In those situations where there is no exterior spandrel panel or spandrel insulation as of yet installed or re-installed on the

side of a damaged building. Thus the apparatus of the present invention allows the peripheral fireproofing insulation construction to be initiated from the inside out in those situations of building damage where the spandrel panels and/or spandrel insulation have been removed by the damaging winds or other cause and not yet replaced. Such reconstruction from the inside out of this insulating system would not be possible with the prior art construction shown in FIG. 7.

[0050] For the purposes of this application the term "coplanar to the floor construction" or "co-planar to the floor" defines the plane of the space extending horizontal or co-planar with the floor surface and the construction supporting the floor therebelow. This area is commonly referred to in the industry as along the "safing line". Thus, the safing insulation and the safing retainment zone is located along the safing line in an area co-planar with the floor and with the support surface located below the floor.

[0051] While particular embodiments of this invention have been shown in the drawings and described above, it will be apparent that many changes may be made in the form, arrangement and positioning of the various elements of the combination. In consideration thereof, it should be understood that preferred embodiments of this invention disclosed herein are intended to be illustrative only and not intended to limit the scope of the invention.

I claim:

1. A means for fireproof sealing between the peripheral edges of a floor of a building and an exterior wall structure thereof with safing insulation, the exterior wall structure including a plurality of wall members extending generally vertically therewithin which are laterally spaced apart with spandrel panels extending therebetween and spandrel insulation positioned thereadjacent, said means for fireproof sealing including an insulation support member attached with respect to and extending between wall members at a position coplanar to an adjacent floor construction, said insulation support member being positioned spatially disposed from the spandrel panels of the exterior wall structure, said insulation support member being positioned spatially disposed from the peripheral edge of a floor to define therebetween a safing insulation retaining zone to facilitate holding and retaining of safing insulation therein by being positioned in abutment therewith for fireproof sealing between the insulation support member and the peripheral edge of the adjacent floor.

2. A means for fireproof sealing between the peripheral edges of a floor of a building and an exterior wall structure thereof which includes a plurality of wall members extending generally vertically therewithin which are laterally spaced apart with spandrel panels extending therebetween and spandrel insulation positioned thereadjacent, said means for fireproof sealing comprising:

- A. a safing insulation means positioned in abutment with the peripheral edge of the adjacent floor for fireproof sealing around; and
- B. an insulation support member attached with respect to and extending between wall members at a position coplanar to an adjacent floor construction, said insulation support member being positioned spatially disposed from the spandrel panels of the exterior wall structure, said insulation support member being posi-

tioned spatially disposed from the peripheral edge of a floor to define therebetween a safing insulation retaining zone to facilitate holding and retaining of said safing insulation means therein by being positioned in abutment therewith for fireproof sealing between the insulation support member and the peripheral edge of the adjacent floor.

3. A means for fireproof sealing between the peripheral edges of individual floors of a building and an exterior wall structure extending therearound as defined in claim 2 wherein said insulation support member further includes a safing abutment surface facing toward the peripheral edge of the individual floor which is adapted to abut safing insulation means positioned within said safing insulation retaining zone.

4. A means for fireproof sealing between the peripheral edges of individual floors of a building and an exterior wall structure extending therearound as defined in claim 2 wherein said insulation support member is positioned spatially disposed from the spandrel panels of the exterior wall structure to define therebetween a spandrel insulation retaining zone to facilitate holding of the spandrel insulation therebetween.

5. A means for fireproof sealing between the peripheral edges of individual floors of a building and an exterior wall structure extending therearound as defined in claim 4 wherein said insulation support member further includes a spandrel abutment surface facing toward the spandrel panels which is adapted to abut spandrel insulation positioned within said spandrel insulation retaining zone.

6. A means for fireproof sealing between the peripheral edges of individual floors of a building and an exterior wall structure extending therearound as defined in claim 2 wherein insulation support member is secured directly with respect to the wall members and extends therebetween.

7. A means for fireproof sealing between the peripheral edges of individual floors of a building and an exterior wall structure extending therearound as defined in claim 2 wherein said insulation support member extends approximately horizontally between the wall members to be oriented generally coplanar with respect to the adjacent floor construction to facilitate retaining of said safing insulation thereagainst.

8. A means for fireproof sealing between the peripheral edges of individual floors of a building and an exterior wall structure extending therearound as defined in claim 2 further comprising mounting brackets secured to each of the wall members and wherein said insulation support member is attached to each wall member by being secured with respect to said mounting brackets secured thereto.

9. A means for fireproof sealing between the peripheral edges of individual floors of a building and an exterior wall structure extending therearound as defined in claim 2 further including member mounting screws for facilitating attaching of said insulation support members with respect to the wall member.

10. A means for fireproof sealing between the peripheral edges of individual floors of a building and an exterior wall structure extending therearound as defined in claim 1 wherein said insulation support member is adapted, prior to attaching thereof to the wall members to be positioned at a location more distant from the peripheral edge of the floor than the final mounting position thereof, and wherein said insulation support member is responsive to move toward the

floor peripheral edge responsive to attaching thereof with respect to the wall members to facilitate compressing of said safing insulation means within said safing insulation retaining means against the adjacent peripheral edge of the floor to enhance firestopping.

11. A means for fireproof sealing between the peripheral edges of individual floors of a building and an exterior wall structure extending therearound as defined in claim 2 wherein said insulation support member is approximately T-shaped with a top section and a body section extending outwardly from said top portion and being oriented approximately normal thereof.

12. A means for fireproof sealing between the peripheral edges of individual floors of a building and an exterior wall structure extending therearound as defined in claim 11 wherein said body section comprises a first body member extending generally perpendicularly outwardly from said top section and a second body member also extending perpendicularly outwardly from said top section and being spatially disposed from said first body member.

13. A means for fireproof sealing between the peripheral edges of individual floors of a building and an exterior wall structure extending therearound as defined in claim 11 wherein said top section defines said safing abutment surface.

14. A means for fireproof sealing between the peripheral edges of individual floors of a building and an exterior wall structure extending therearound as defined in claim 5 wherein said body section defines said spandrel abutment surface.

15. A means for fireproof sealing between the peripheral edges of individual floors of a building and an exterior wall structure extending therearound as defined in claim 11 wherein said top section is oriented extending approximately vertically and wherein said body section is oriented extending approximately horizontally responsive to said insulation support member being attached with respect to and extending between the wall members.

16. A means for fireproof sealing between the peripheral edges of individual floors of a building and an exterior wall structure extending therearound as defined in claim 11 wherein said insulation support member include a first L-shaped angle member and a second L-shaped angle member in direct abutment with respect to one another to provide the body section of the T-shape of said insulation support member with the remaining portions of said first L-shaped angle member and the second L-shaped angle member extending oppositely away from one another to define said top section, the body portion of the T-shape being positioned coplanar with the floor construction to provide a means for stiffening and compressing of the safing insulation extending therearound at floor level.

17. A means for fireproof sealing between the peripheral edges of individual floors of a building and an exterior wall structure extending therearound as defined in claim 1 further comprising a sealing membrane for enhancing fireproof sealing between the peripheral edge of the floor and the exterior wall structure, said membrane being attached to the floor adjacent the peripheral edge thereof and extending outwardly over the safing insulation and being attached to the insulation support member for enhanced sealing.

18. A means for fireproof sealing between the peripheral edges of individual floors of a building and an exterior wall structure extending therearound as defined in claim 1 further

comprising a sealing membrane for enhancing fireproof sealing between the peripheral edge of the floor and the exterior wall structure, said membrane being attached to the floor adjacent the peripheral edge thereof and extending outwardly over the safing insulation and over the spandrel insulation being attached directly to the spandrel insulation for enhanced sealing.

19. A method for fireproof sealing between the peripheral edges of a floor of a building and an exterior wall structure wherein the exterior wall structure includes a plurality of wall members extending generally vertically therewithin which are laterally spaced apart with spandrel panels extending therebetween and spandrel insulation positioned there-adjacent, said method for fireproof sealing including:

- A. providing an insulation support member having a safing abutment surface and a spandrel facing portion defined thereon oriented facing outwardly therefrom in approximately opposite directions;
- B. attaching the insulation support member at a position extending between the wall members with the safing abutment surface thereof facing toward the peripheral edge of the floor to define therebetween a safing insulation zone and with the spandrel facing portion facing approximately oppositely toward the location of the spandrel insulation and spandrel panels;
- C. positioning the safing insulation into the safing retaining zone defined between the peripheral edge of the floor and the safing abutment surface of the insulation support member for fireproof sealing therearound.

20. A method for fireproof sealing between the peripheral edges of a floor of a building and an exterior wall structure thereof as defined in claim 19 wherein said providing an insulation support member is performed with a spandrel facing portion which comprises a spandrel abutment portion adapted to directly abut the spandrel insulation position extending between adjacently positioned vertically extending wall members and extending across a spandrel panel to provide a fireproof seal between the peripheral edges of a floor and the exterior wall structure positioned outwardly therefrom formed by the safing insulation positioned along the peripheral edge of the floor and by the insulation support member and by the spandrel insulation.

21. A method for fireproof sealing between the peripheral edges of a floor of a building and an exterior wall structure thereof as defined in claim 19 further comprising compressing of the safing insulation prior to positioning thereof into the safing retaining zone to facilitate fireproofing sealing therewith.

22. A method for fireproof sealing between the peripheral edges of a floor of a building and an exterior wall structure thereof as defined in claim 19 wherein said attaching the insulation support member includes securing the insulation support member to each of a pair of adjacently positioned vertically extending wall members at a position extending approximately horizontally therebetween and coplanar with respect to the floor construction and the safing insulation positioned therearound.

23. A method for fireproof sealing between the peripheral edges of a floor of a building and an exterior wall structure thereof as defined in claim 19 wherein said attaching the insulation support member includes:

- A. providing a first mounting bracket and a second mounting bracket;

- B. securing the first mounting bracket to a vertically extending wall member at a position coplanar with the adjacent floor construction;

- C. securing the second mounting bracket to an adjacently positioned vertically extending wall member at a position coplanar with the adjacent floor construction;

- D. securing the insulation support member to said first mounting bracket and said second mounting bracket at a position extending approximately horizontally therebetween and coplanar with respect to the adjacent floor construction and the safing insulation positioned therearound.

24. A method for fireproof sealing between the peripheral edges of a floor of a building and an exterior wall structure thereof as defined in claim 19 wherein said attaching the insulation support member is performed at a position between the spandrel insulation and the safing insulation zone for maintaining the safing insulation within the safing retaining zone while also providing insulation protection for the insulation support member.

25. A method for fireproof sealing between the peripheral edges of a floor of a building and an exterior wall structure thereof as defined in claim 19 wherein said attaching the insulation support member includes providing a screw means engageable with respect to the insulation support member and with respect to the vertical wall member to facilitate attaching therebetween.

26. A method for fireproof sealing between the peripheral edges of a floor of a building and an exterior wall structure thereof as defined in claim 24 wherein attaching of the insulation support member comprises:

- A. initial placing of the insulation support member at a position displaced outwardly from the desired mounting location thereof in a direction away from the peripheral edge of the floor; and

- B. engaging said screw means with respect to the insulation support member and with respect to the vertically extending wall member without completely tightening thereof to maintain the insulation support member at a position displaced outwardly from the desired mounting location thereof in a direction toward the spandrel panel.

27. A method for fireproof sealing between the peripheral edges of a floor of a building and an exterior wall structure thereof as defined in claim 26 wherein said positioning of the safing insulation includes positioning of a portion of the safing insulation between the safing retain zone and the initially placed position of the insulation support member.

28. A method for fireproof sealing between the peripheral edges of a floor of a building and an exterior wall structure thereof as defined in claim 27 further comprising final tightening of the screw means to fixedly secure the insulation support member with respect to the vertically extending wall members while moving the insulation support member away from the spandrel panels and toward the safing retaining zone to the desired final mounting location, said insulation support member being adapted to simultaneously compress the safing insulation into the safing retaining zone as the insulation support member is moved inwardly toward the safing retaining zone responsive to said final tightening of the screw means.

29. A method for fireproof sealing between the peripheral edges of a floor of a building and an exterior wall structure thereof as defined in claim 19 wherein attaching of the insulation support member comprises:

- A. initial placing of the insulation support member at a position displaced outwardly from the desired mounting location thereof in a direction away from the peripheral edge of the floor;
- B. positioning of a the safing insulation between the safing abutment surface of the insulation support member located in the initially placed position thereof and the peripheral edge of the floor; and
- C. finally securing of the insulation support member in the desired mounting location attached to wall members while moving thereof inwardly toward the peripheral edge of the floor while simultaneously compressing the safing insulation into the safing insulation retaining zone.

30. A method for fireproof sealing between the peripheral edges of a floor of a building and an exterior wall structure thereof as defined in claim 19 wherein said providing an insulation support member includes providing of a T-shaped insulation support member having a top section and a body section oriented approximately perpendicularly with respect to one another and wherein said attaching of the insulation support member is performed to orient the top section to abut inwardly against the safing retaining and to orient that body section outwardly in abutment with the spandrel insulation positioned between the vertically extending wall members and across the interior side of the spandrel panels.

31. A method for fireproof sealing between the peripheral edges of a floor of a building and an exterior wall structure thereof as defined in claim 19 wherein the top section extends vertically facing inwardly to facilitate compressing of the safing insulation into the safing retaining zone and wherein the body section extends outwardly horizontally and presents a spandrel abutment edge to retain the spandrel insulation in place extending over the interior spandrel panel surface and effectively provide a fireproofing seal along with the safing insulation and the spandrel insulation between the peripheral edge of the floor and the exterior wall structure.

32. A method for fireproof sealing between the peripheral edges of a floor of a building and an exterior wall structure thereof as defined in claim 30 wherein said T-shaped insulation support member is provided with a body section which includes two body members spaced apart from one another and both extending approximately perpendicularly away from the top section thereof.

33. A method for fireproof sealing between the peripheral edges of a floor of a building and an exterior wall structure

wherein the exterior wall structure includes a plurality of wall members extending generally vertically therewithin which are laterally spaced apart with spandrel panels extending therebetween and spandrel insulation positioned there-adjacent, said method for fireproof sealing including:

- A. providing an insulation support member having a safing abutment surface and a spandrel facing portion defined thereon oriented facing outwardly therefrom in approximately opposite directions;
- B. providing a screw means for attaching the insulation support member at a position extending between the wall members with the safing abutment surface thereof facing toward the peripheral edge of the floor to define therebetween a safing insulation zone and with the spandrel facing portion facing approximately oppositely toward the location of the spandrel insulation and spandrel panels;
- C. initial placing of the insulation support member at a position displaced outwardly from the desired mounting location thereof in a direction toward the spandrel panel; and
- D. engaging said screw means with respect to the insulation support member and with respect to adjacent vertically extending wall members without completely tightening thereof to maintain the insulation support member at a position displaced outwardly from the final desired mounting location thereof in a direction toward the spandrel panel.
- E. positioning a portion of the safing insulation into the safing retaining zone defined between the peripheral edge of the floor and the safing abutment surface of the insulation support member for fireproof sealing there-around and positioning of a portion of the safing insulation between the safing retain zone and the initially placed position of the insulation support member; and
- F. final tightening of the screw means to fixedly secure the insulation support member with respect to the vertically extending wall members while moving the insulation support member away from the spandrel panels and toward the safing retaining zone to the desired final mounting location, said insulation support member being adapted to simultaneously compress the safing insulation into the safing retaining zone as the insulation support member is moved inwardly toward the safing retaining zone responsive to said final tightening of the screw means.

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