Aug. 25, 1964 G. E. STREHAN ETAL 3,145,811

PREFABRICATED FIREPROOF BUILDING COLUMN

Filed April 17, 1961

Fig. 1.

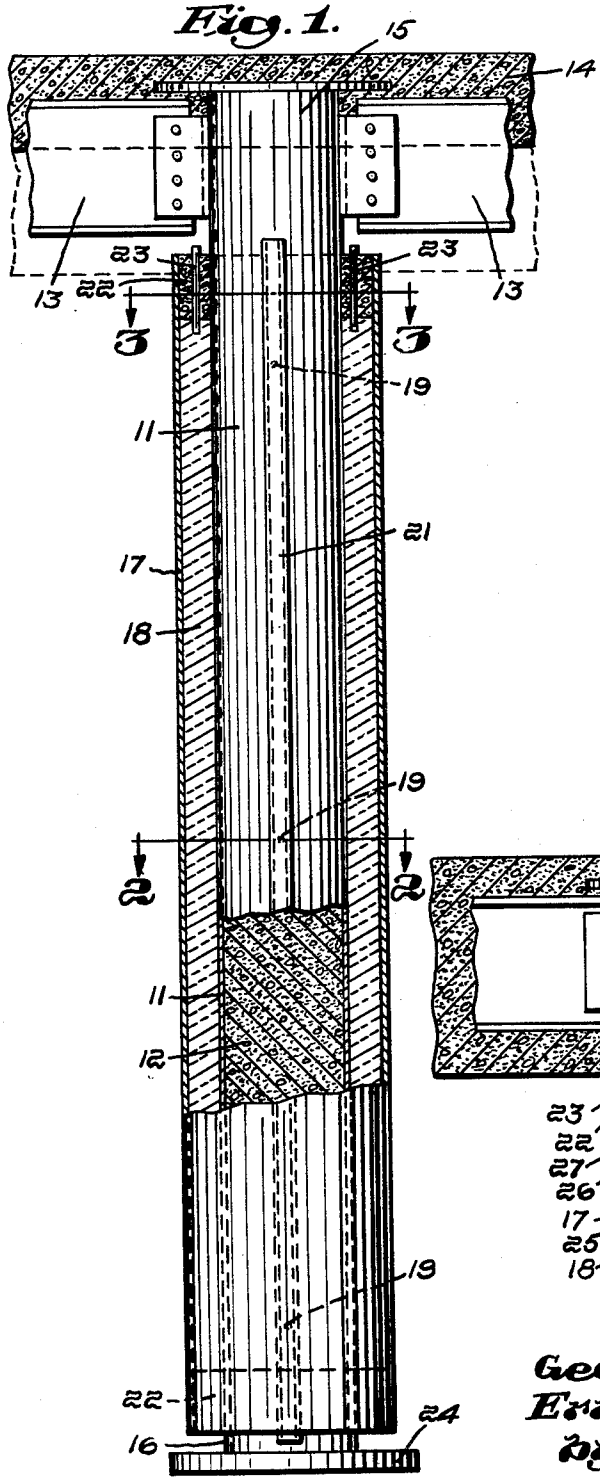



Fig. 2.

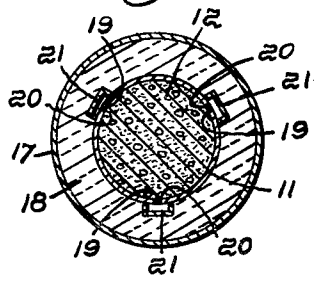



Fig. 3.

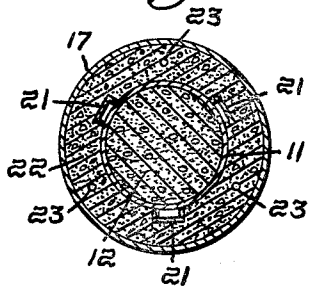
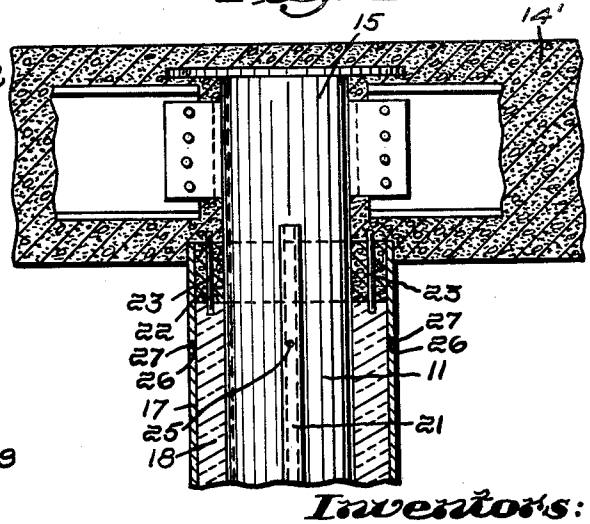



Fig. 4.




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# PREFABRICATED FIREPROOF BUILDING COLUMN

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This invention relates to structural columns of the concrete-filled steel casing type, and pertains more particularly to prefabricated fireproof columns used as vertical supports in fireproof buildings.

The principal purpose of the invention is to provide a novel building column which not only resists fire and heat due to the incorporation of thermal insulation in its structure, but also ensures effective ventilation of the column and its protective covering, so that the pressure of expanding steam or other vapors, generated in the concrete core and in the insulation will be automatically released and the disintegration of the concrete and distortion of the column casing will be checked or retarded.

Other advantageous features of the invention will be apparent from the following description of the recommended embodiments of the invention shown on the accompanying drawings. It will be understood, however, that the structural details of the fireproof columns herein illustrated and described may be varied to suit particular conditions without departing from the essence of this invention as set forth in the appended claims.

In the drawings:

FIG. 1 is an elevation, partly broken away and in section, of a building column embodying the invention and used to support a fireproof floor;

FIGS. 2 and 3 are sections taken on lines 2—2 and 3—3 respectively of FIG. 1; and

FIG. 4 is a fragmentary view similar to FIG. 1 showing a modification of the ventilating outlets below a concrete floor.

In the embodiment chosen for the purpose of illustration in FIGS. 1 to 3, the supporting body of the improved fireproof column comprises a steel casing 11 filled with concrete 12, or other suitable core material, constituting the load-bearing element of the structure and having the general characteristics of similar columns heretofore used for that purpose to support the steel beams 13 of a concrete floor 14. If desired, the upper end of the column body may be provided with head frames of the type disclosed in Patents Nos. 2,469,455, 2,816,435 or 2,834,196. The steel casing 11 may be cylindrical, rectangular, or of other desired cross-sectional shape.

The casing 11 is enclosed, except for its extreme end portions 15 and 16, by an insulating sheath consisting of an outer casing or shell 17, which may be of steel and cylindrical as shown, or of other desirable cross-sectional shape, suitably spaced from said casing, and a filling of asbestos 18 or other thermal insulating material, of such thickness and density as to provide the required fire resistant properties for the particular installation, according to the fire hazard involved.

In accordance with this invention, means are provided effectively to ventilate both the core 12 of the structural body, and the insulating envelope 18. As shown, the ventilating system for the column body comprises a series of ports or openings 19 in the wall of casing 11, said ports being preferably plugged with a wax 20, or other material having a low melting point. The wax plugs retain the concrete within casing 11 when the casing is being filled, but will melt away under excessive heat to permit the escape of expanding steam or other vapors generated in the concrete core 12. The number and arrangement of



the ports 19 must be adequate to ensure proper venting of the expanding gases in the casing, as determined by the size of the column. As shown, three series of three ports each are uniformly spaced around the casing 11, approximately at the mid point and also near the ends of the column, with the ports in longitudinal rows.

Each row of such venting ports is preferably covered by a duct 21, which may consist of a steel channel, spot-welded or otherwise secured to the exterior of the casing 11. The ducts are preferably longer than shell 17 of the insulating envelope, so that they project beyond that envelope, at least at the upper end thereof. Thus, the ducts afford free passageways for the escape of steam and vapors from the core 12 to the top of the insulated area of the column.

The respective ends of the insulating sheath are preferably plugged at 22 with concrete or the like, said plugs serving to retain the loose asbestos or other thermal insulation 18 between the inner casing 11 and the outer casing 17. The upper plug or stop is provided with one or more ventilating tubes 23, three such tubes being shown in FIG. 3. The tubes extend through the upper plug (FIG. 1) and preferably project beyond the upper end of the outer casing, so that expanding gases generated by excessive heat within the insulating covering may readily escape therethrough. The tubes 23 may lead upwardly to the ambient atmosphere beneath the concrete floor 14 and the beams 13, so that the column core 12 and the insulating envelope 18 are freely vented to the exterior of the fireproof column; for the ends of the insulating sheath are preferably uncovered and unenclosed to permit normal expansion upwardly and downwardly, whereas, the inner, structural column extends from the supporting floor or other base 24 into the flooring above as indicated at 15.

When the concrete flooring 14' covers the upper end of the outer casing, as shown in the modification of FIG. 4, other venting outlets 25 and 26 for the ducts 21 and the insulation-containing space 18, respectively, should be disposed below the insulation-confining plug 22, the duct openings 25 communicating with the insulation space or envelope 18 and thence through casing vents 26 to ambient atmosphere. Outlets 25 and 26 are preferably disposed in or adjacent a common plane radial to the column, and said openings are normally closed by heat-meltable plugs 27, similar to the plugs 20 in the ports 19.

The fireproof column is preferably prefabricated to structural specifications with the ventilating ducts affixed over the ports in the casing 11 and may have the ventilating tubes secured in the plugs 22 at the ends of the insulating envelope 18. In case the plugs 22 are insufficient to hold the insulating shell 17 in proper position relative to the casing 11 of the structural column, the spaced columns may be provided with suitable means (not shown) to maintain the required spacing of the concentric casings and to restrain relative longitudinal movement between the casings. For example, projecting lugs or knobs could obviously be formed on the interior surface of the outer casing and on the exterior surface of the inner casing, in the region of the concrete plugs 22 at the opposite ends of outer casing 17, so that the concrete-embedded projections would ensure against relative movement of the respective casings, either transversely or longitudinally.

It is apparent from the foregoing that a fireproof column fabricated in accordance with this invention will effectively prevent failure of the column due to the accumulation of excessive temperatures and gaseous pressures within the load-bearing concrete or within the thermal insulation covering the inner column, and will permit the development of the required fire rating period under

the specified design load for a fire-resistant building column of this type.

We claim:

1. A fireproof column comprising an inner casing having a load-bearing core therein, an outer casing spaced transversely from the inner casing, thermal insulation disposed in the space between said casings, a ventilating duct fixed to the wall of said inner casing, said duct extending longitudinally along the exterior surface of said inner casing and leading toward the top thereof, a port in said wall communicating with said duct, the upper end portion of said duct having an outlet to ambient atmosphere, and means independent of said duct for venting said space to ambient atmosphere.

2. A fireproof column as described in claim 1, said means comprising a ventilating tube leading from said space to said atmosphere.

3. A fireproof column as described in claim 1, comprising an insulation confining plug disposed between the two casings adjacent the upper end of the outer casing, and a ventilating tube extending through said plug and constituting the means for venting said space.

4. A fireproof column as described in claim 1, comprising insulation-confining plugs disposed between the two casings adjacent the opposite ends of the outer casing, said duct having a vent opening spaced inwardly from the plug at the upper end of said outer casing and communicating with said space, and said outer casing having a vent opening disposed inwardly from said upper plug and communicating with ambient atmosphere.

5. A fireproof column as described in claim 4, said vent openings having heat-meltable plugs therein, respectively.

6. A prefabricated fireproof column comprising an inner casing having a load-bearing core therein, an outer casing spaced transversely from the inner casing and longitudinally disposed intermediate the ends of the inner



casing, thermal insulation disposed in the space between said casings, a ventilating duct fixed to the exterior surface of the inner casing and leading toward the top thereof, a plurality of vent ports in the wall of the inner casing communicating with said duct, heat-meltable plugs in said ports, insulation-confining plugs disposed in the space between said casings adjacent the opposite ends of the outer casing, said duct and said space having outlets to ambient atmosphere.

7. A prefabricated fireproof column as described in claim 6, the outlet from said space comprising a ventilating tube extending through the insulation-confining plug at the upper end of said space, and said duct extending upwardly above said plug.

8. A prefabricated fireproof column as described in claim 6, said duct having a vent opening spaced inwardly from the insulation-confining plug at the upper end of said space and communicating with said space, and said outer casing having a vent opening disposed inwardly from said upper plug and communicating with ambient atmosphere, said vent openings having heat-meltable plugs therein, respectively.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 312,349 | Griffin | Feb. 17, 1885 |
| 750,456 | Hartman | Jan. 26, 1904 |
| 795,362 | Numan | July 25, 1905 |
| 1,523,977 | Pillar | Jan. 20, 1925 |
| 2,192,933 | Saborsky | Mar. 12, 1940 |
| 2,787,345 | Soubier et al. | Apr. 2, 1957 |

FOREIGN PATENTS

| | | |
|---|---|---|
| 515,819 | Great Britain | Dec. 14, 1939 |