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W. H. WILSON ET AL

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BUILDING CONSTRUCTION

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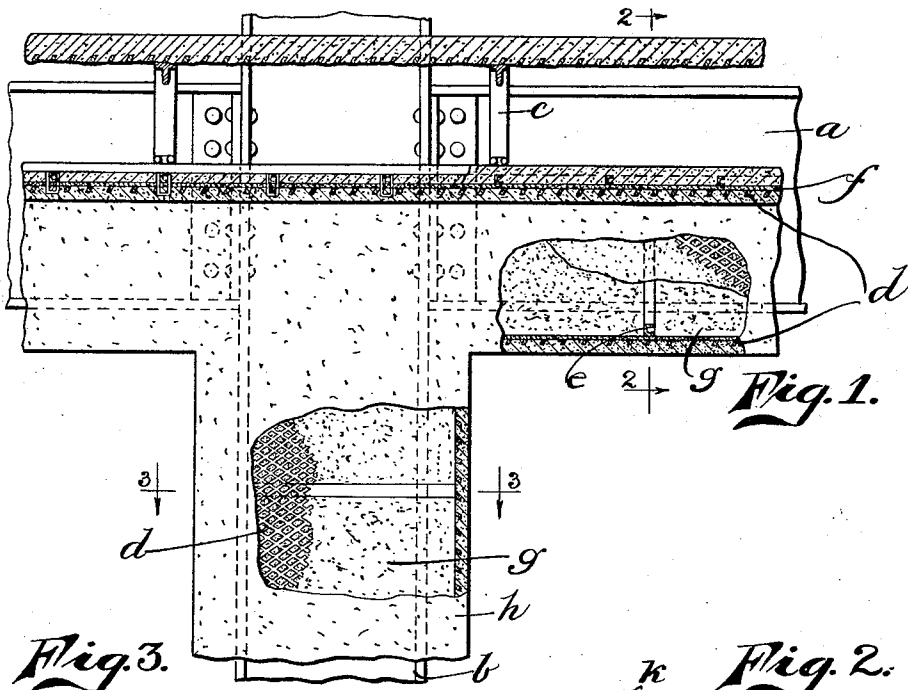


Fig. 3.

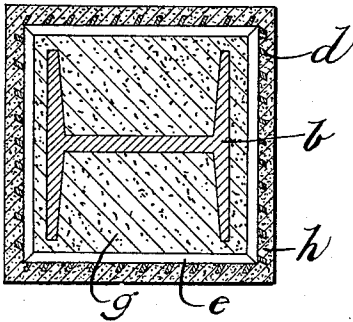


Fig. 2.

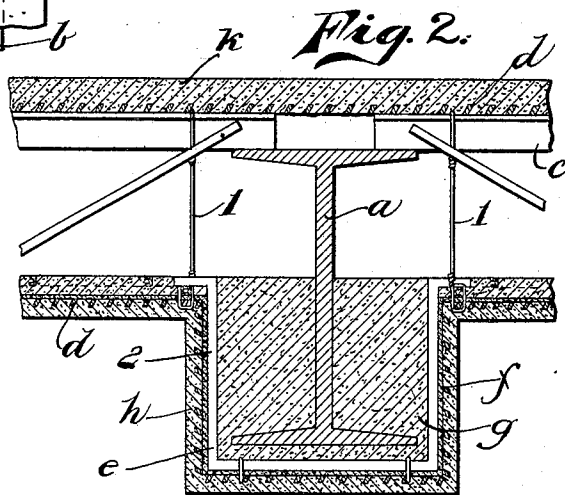
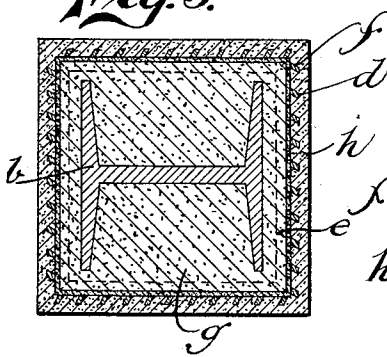
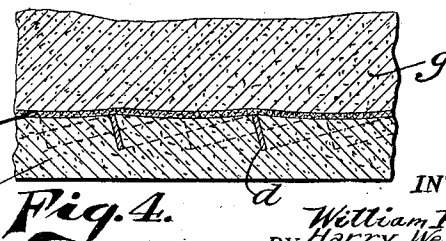


Fig. 5.



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UNITED STATES PATENT OFFICE

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BUILDING CONSTRUCTION

Application filed November 9, 1927. Serial No. 232,121.

This invention relates broadly to building constructions, and more particularly to an improved method and means for obtaining certain desired results in such construction, such as the fireproofing thereof. The invention provides a better piece of finished work with the elimination of surface stains and in less time and at less expense than has heretofore been possible. The method is readily workable, does not require skilled labor and is generally superior.

With the above and other objects in view, the invention consists in the novel and useful provision, formation, construction and association of parts, members and features, as well as a method of use, certain adaptations of which are shown in the accompanying drawing, described generally and more particularly pointed out in the claims.

In the drawings:

Fig. 1 is an elevation partly in section showing a possible construction for fabricated structures, utilizing the improved invention;

Fig. 2 is a cross-sectional view on the line 2-2 of Fig. 1;

Fig. 3 is a cross-sectional view on the line 3-3 of Fig. 1;

Fig. 4 is an enlarged cross-sectional view illustrating a portion of this construction in which the invention is utilized, the bottom line of Fig. 4 represents the exterior surface of the construction after finished plaster has been applied;

Fig. 5 is a further sectional view of the invention.

Corresponding parts in all the figures are designated by the same reference characters.

Referring now with particularity to the drawings, we have illustrated our improved invention in an adaptation for building purposes wherein it is desired to fireproof the building structure. In so fireproofing said structure we have provided an effective medium for preventing transmission of heat.

We have found it expedient to provide for our fireproofing medium a material which is relatively inexpensive and to so apply said material that a skilled workman is not required for its application. We have found that

gypsum or similar material used alone or mixed with other ingredients and applied to the fabricated structure in a manner to be described, functions to provide the objects of this invention.

In the drawing *a* is a beam adapted to be supported by a column *b* and it will be noted that the floor supporting members *c* are secured to the beam *a* in the customary manner. In the case of the columns, surrounding said columns is a foraminous member such as expanded metal lath *d* and this expanded metal lath is held spaced from the column *b* by what are known as channel reinforcements *e*. So far the elements just described are ordinary for metal lathing construction when used only to support the plaster finish. The use of the foraminous member such as metal lath *d* is continued with respect to the beams *a*, as shown in Fig. 2, with said lath supported by any suitable means as 1 and 2, the part 2 acting as a hanger or channel reinforcement and the part 1 including means for securing the member 2 to the beam *c*. It will also be noted in Fig. 2 that the floor supporting member *c* may be covered with the lathing *d* to support the floor slab *k*. We now surround the column or columns *b* with gypsum or other material in a dry state and in this regard it will be noted that the gypsum or other material will be confined inside metal lathing *d*. Where the metal lathing is inclined to vertical, such as horizontal metal lathing which would surround the beam *a*, we provide a paper *f* adapted to rest on the metal lathing or, for that matter, any water absorbing material which may be applied to the metal lath and then pour the gypsum or other material in a dry state upon said paper or equivalent element *f*, as illustrated in the figures. This gypsum or other material may then be sprayed or soaked with water or other liquid, or in the case of the element *f*, the water or other liquid may be directed against the outside of such element and passed through it causing the gypsum or other material to harden. The gypsum or other material will be designated as *g*.

It is apparent that by the method just out-

lined, we eliminate certain undesirable features that have previously been used in fireproofing, to wit, we fireproof more rapidly and with less difficulty than heretofore, and likewise lighter, simpler and more porous forms may be utilized as the ingredients to be held are in a dry state and not fluid and are therefore less likely to run or to create hydraulic pressure in forms in which a hydraulic head could be created. The question of moisture content with gypsum particularly in columns, girders, or where large masses of gypsum are used, is a serious one in that all the water not used in crystallization must be expelled through the surface of the gypsum. This is sometimes a slow procedure and has a tendency to carry any impurities and stains within the gypsum to the surface of said gypsum. By applying the gypsum in a dry state and then adding the water afterwards to the surface of said gypsum, the moisture is taken from the surface inwardly of the said gypsum, so as to carry the stains away from the face and a lesser amount of water may be used as only the amount necessary to cause crystallization of the calcined gypsum is required as it is not necessary to use the excess water required to make the wet gypsum fluid as has heretofore been done. It is obvious that a much less amount of water may be used and therefore a correspondingly less amount will have to be removed by evaporation. Of course it is understood that the gypsum used by us is in the calcined form requiring water to be added thereto to cause it to recrystallize.

It is also within the purview of our invention to apply some glutinous or other material to the metal lath which will take the place of paper fabric or the like *f*, and which is sufficient to retain the gypsum or other material on said lath, but which will readily allow water or other liquid to pass through to be absorbed by the gypsum or other material. The gypsum or other material may be poured to provide a first layer which has water or other liquid then sprayed upon it or added to it, then a further thickness of gypsum or other material is applied to make the total thickness required for the fireproofing. It is evident that the water or other liquid in the first layer of gypsum or other material will in a measure be absorbed by the second layer.

Other ingredients may be used in the place of gypsum, such as diatomaceous earth combined with Portland cement, pumice with gypsum or Portland cement, magnesite or similar binder might be used as a base for the solidifying part of the ingredients and asbestos or other heat insulating material might be used as an aggregate. The invention more particularly resides in the method of installing the material as applied to fireproofing of the fabricated frame and constructing the

members in building construction rather than to the materials themselves.

Many methods may be utilized for the wetting of the gypsum or other material, a few of which will be set forth. One is to add the water or other liquid as the gypsum or other material is being put in place; another is to wet the gypsum or other material after it is in place by providing openings in said material through which the water or other liquid may pass and be absorbed by the gypsum or other material, or the fireproofing material might be wrapped with a burlap or similar material before or after the dry material is in place, with the burlap wetted so that the water or other liquid would be absorbed by the fireproofing material from said burlap, or by merely spraying water or other liquid upon the gypsum or other material either from above or through the openings in the foraminous member. Tanks or jet outlets could be provided for wetting the fireproofing material.

After the gypsum or other material has been set, plaster, concrete or the like *h* may be applied to the outer surface of the foraminous member *d*, as illustrated in the drawing. In Fig. 4 we have illustrated a ceiling construction wherein paper or a similar element *f* has been applied to a surface of the foraminous member with the gypsum applied thereon. The finish cement or plaster is shown as *h*, and is not essential to this invention. This construction would be used for horizontal ceilings or any where desired, the purpose being to prevent the gypsum from passing through the openings of the foraminous member.

As a summary of our invention, in so far as it relates to fireproofing, the present method of fireproofing a structure with poured aggregates is to construct forms permanent or removable into which wet gypsum or other wet material is poured. In order to get this wet material around the members to be fireproofed it must be quite fluid and it is obvious that the forms must be close fitting, non-porous and rigidly constructed. Our method of fireproofing a structure is the erection of metal forms composed of some form of metal lath, wire fabric, wire mesh, or other metallic or non-metallic encasing material, held in place and reinforced by ordinary or special furring channels or other means so as to form the exterior or surface of the fireproofing and in which, or upon which is placed the dry material which is wet either above or from the outside or through embedded conduits, just as the dry material falls in place or after it is all in place, which causes it to crystallize or harden.

Along with the other advantages noted herein another very important one is that with our method it is not necessary to use the customary expensive and cumbersome mixers

to mix the water or other liquid with the dry materials nor the equipment necessary to transport the wet mixture from the mixers to the final position. With our method the dry materials are taken directly to their final position in the structure and the water or other liquid added after the dry materials are in place or as they are falling into place and the costs incident to mixing are saved. It is also readily seen that by this method there is not the usual muss nor debris on the job which is always present when the mixing is done before placing in the forms.

Furthermore, we have discovered with our method that the finished mass is of greater specific gravity when the water or other liquid necessary to cause the dry material to harden is added as described by our invention than when mixed with the dry material before being put in place. This is for the reason that the excess amount of water or other liquid to make the mass fluid leaves upon evaporation a considerable amount of voids in the final product and it has been proven by tests, as recorded by Bureau of Standards Technichologic Paper Number 130, page 25, that the heat insulating qualities are improved as the density or specific gravity of the material is increased.

Also, it is a known fact that the crystalline structure produced when the water or other liquid is added to the above contemplated dry materials is in a considerable measure destroyed if the mixing be carried on beyond the instant when this crystalline structure commences to form. With our invention this difficulty is entirely eliminated and we therefore obtain a more uniform and stronger finished product.

This invention may be used for construction and other purposes as well as for fireproofing. For example, ceiling slabs and floor slabs, roofs and walls and structural members in a structure may be constructed by using a dry material supported by suitable forms, which may be either permanent or removable, foraminous or watertight, and adding a liquid to the material after it is in place or as it is being placed causing it to harden so giving it structural strength. We have described and referred in our drawings and specifications particularly to the fireproofing part of our invention as the construction part is based on the same underlying principles and can be readily understood from what has been already described and explained.

Another adaptation of our invention is that with suitable forms the proper amount of water or other liquid required to crystallize or harden the mass may be placed therein first and the dry material then added in lieu of the order of procedure described above.

It is obvious that various changes, modifications and variations may be utilized in

practising the invention, in departure from the particular description as given, without departing from the true spirit of the invention.

Having thus disclosed our invention, we claim and desire to secure by Letters Patent:

1. The method of fireproofing a building structure, which consists in providing a foraminous member, applying dry gypsum to said foraminous member at the zone of application, then wetting the gypsum to cause a hardening thereof.

2. The method of fireproofing a fabricated building structure, which consists in surrounding a structural member with metal lathing, providing a water absorbing material over said metal lathing, then pouring dry gypsum within said water absorbing material, then spraying said water absorbing material whereby the dry gypsum is caused to absorb the water and harden.

3. The method of fireproofing a building structure which consists in providing a foraminous member, applying thereto a water absorbing material, then placing upon said water absorbing material a calcined dry gypsum, then applying moisture to the water absorbing material to in turn be absorbed by the gypsum to cause a hardening of said gypsum.

In testimony whereof, we have signed our names to this specification.

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HARRY WESTBERG.