

M. F. LYONS.  
Fire-Proof Material for Walls, Ceilings, Flues, &c.

No. 200,320.

Patented Feb. 12, 1878.

Fig: 1.

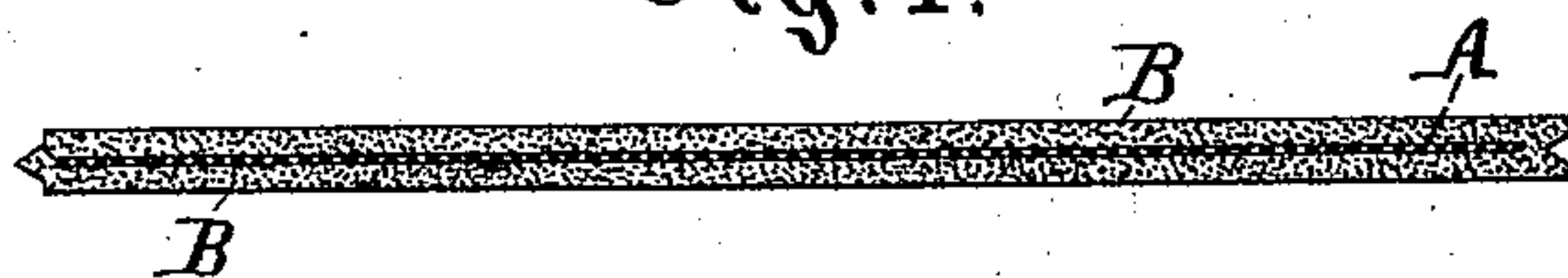


Fig: 2.

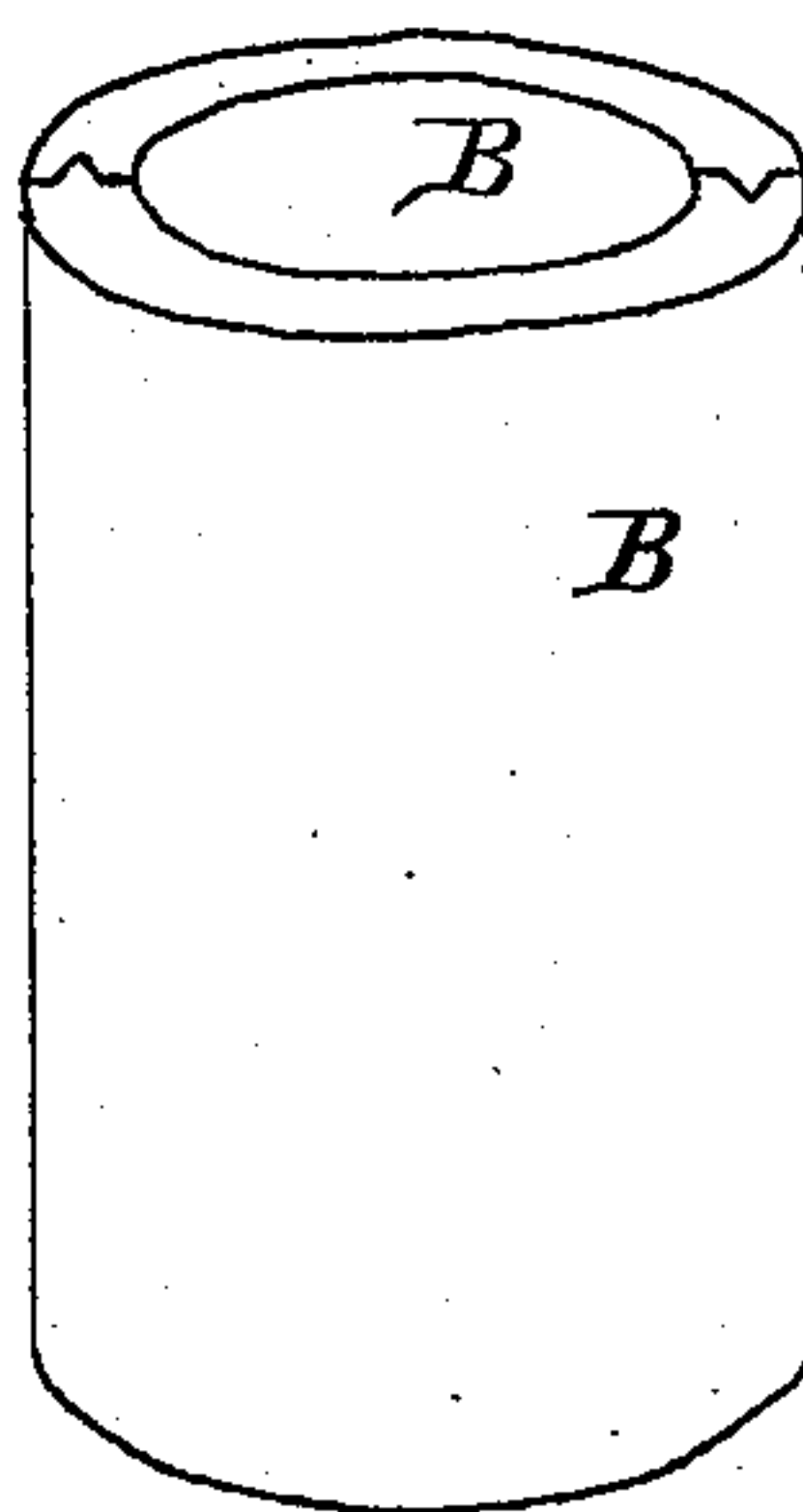
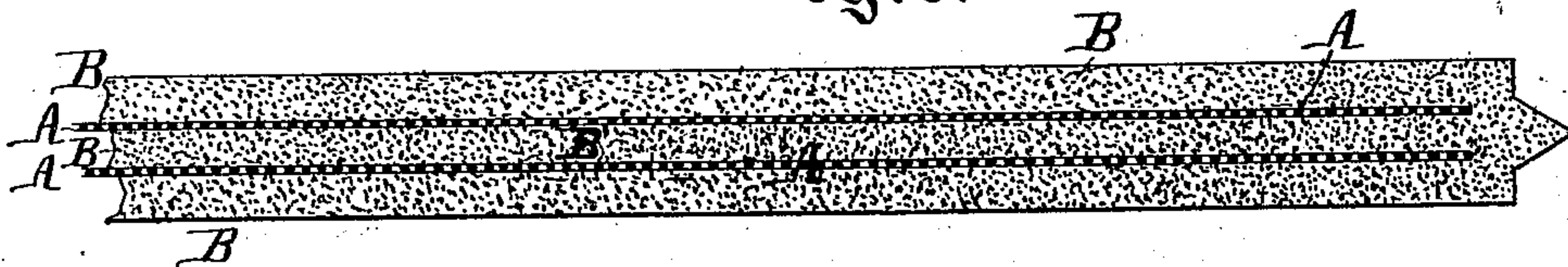


Fig: 3.



Witnesses:

H. A. Johnston.  
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Inventor:

M. F. Lyons,  
by his attorney  
Thomas D. Stetson,  
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# UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN FIRE-PROOF MATERIALS FOR WALLS, CEILINGS, FLUES, &c.

Specification forming part of Letters Patent No. **200,320**, dated February 12, 1878; application filed December 17, 1877.

*To all whom it may concern:*

Be it known that I, MICHAEL F. LYONS, of New York city, in the county and State of New York, have invented certain new and useful Improvements relating to Fire-Proof Material, of which the following is a specification:

I have invented a composition which is eminently adapted to serve in this manner. I employ slabs or pieces of material formed of this composition with toughening material incorporated. The composition is one part shell-lime, two parts calcined plaster, (sulphate of lime,) and three parts coal-ashes or coal-cinder, finely comminuted. To this I add alum in a very finely-diffused condition, which materially hardens it and improves its general qualities, besides rendering it more fire-proof.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a cross-section through one of the slabs. Fig. 2 is a perspective view of a set of curved slabs united to form a flue, or a flue-lining or flue-covering; and Fig. 3 is a section through a modification of slab on a larger scale.

Similar letters of reference indicate like parts in all the figures.

A is a sheet of woven wire, of a length and breadth a little less than the corresponding dimensions of the slab which is to be made. B is the body of the slab, formed of the compound described.

I propose to incorporate the materials as follows: Dissolve the common alum of commerce in water, in the proportion of one part of alum to one hundred parts of water. Sift the coal-ashes or finely-broken cinder, to remove any coarse masses, and incorporate it with the above-designated amount of calcined plaster and quicklime, the required proportions being three pounds of ashes; one pound of the strongly-cementing lime, and two pounds of the quick-setting plaster. The lime should be freshly made from oyster-shells or other shells, and coarsely ground. Then, having prepared a number of the wire nets or woven-wire pieces A and a set of molds of proper

size, I rapidly mix a sufficient quantity of the dry material with so much of the alum solution as is required to make it work properly, and deposit a layer in the mold to about half the required thickness. I then press therein the wire net, and immediately deposit the remainder of the quantity of the composition, and press together and smooth the whole. I can cover and subject it to a severe pressure, if desired.

I can, instead of the wire-netting, use wires laid more or less regularly in two or more directions, connected together or not; or I can use various fibers—jute, hemp, or the like—variously laid in the slabs. A good form is a coarsely-woven fabric analogous to mosquito-netting, but coarser. It is only essential that the strengthening material be strong and tough, of a character to be seized strongly by the composition, and be in the form of long and relatively slender filaments.

Changes may be made in the mode of applying the parts together; but it is important that allowance be made for the ebullition and escape of the gas due to the slaking of the lime, and that only a little time be allowed to elapse after the wetting of the plaster before the molding is completed.

My slabs are strong and particularly tough. By reason of the water of crystallization held in the alum, their fire-proof qualities stand very high, even when vegetable matter is employed in their interiors. By reason of its porous character the material is a good non-conductor of heat. The slabs will endure high temperature, and are strong, light, and suitable for use in or on walls and ceilings in any situation where a coating of fire-proof material is desired.

Nails or other fastenings may be driven through or engaged with them; but I prefer to employ no such heat-conductors. They may be set and made to adhere well to ordinary material by common lime mortar or other cement. I can make the slabs of curved form, and use them for flues of circular section, making them form either the main bodies of the flues or a lining or an exterior casing. I propose to make them of considerable thickness in cases which require it, and can in such cases apply the woven wire or other strengthening



material in two or more layers. This condition is shown in Fig. 3.

What I esteem a very important feature in all forms of the construction is the V-shaped edges. Two of the edges of each slab are made with a salient or projecting angle. The two other edges are formed with corresponding re-entering angles or grooves. Both the projecting and the retiring angles are V-shaped. The two kinds of edges match into each other in the applying of a series of slabs together to form a ceiling or wall. They aid in insuring that the slabs shall form a smooth and continuous surface.

I propose in some cases to increase the proportion of alum until the water becomes a nearly or quite saturated solution; but even the small quantity here designated, which is about one-half of one per cent. of the whole quantity of material, has the effect to not only increase the fire-proof quality, but also imparts hardness and strength to the slabs.

It will be understood that I can vary the form of my block, as well as the thickness, within wide limits. One of the places where I propose to use it is in filling between the iron floor-beams of fire-proof buildings. For that purpose I can make the brick or material of sufficient length to span the entire distance,

say four or five feet in one length, making them with a little offset where they take hold of the bottom flange of the iron, so that the bottom surface will be flush with or a little below the lower face of the iron. I also propose to use this in place of roofing-boards, to be secured upon either wood or iron beams. I can make the blocks rectangular outside, and with a hollow interior for use as flues, or to serve simply, by the air-space within them, to form hollow partition-blocks.

I claim as my invention—

1. The fire-proof composition described, composed of shell-lime, plaster-of-paris, coal-ashes or the like light earthy matter, and alum, as herein specified.

2. As a new article of manufacture, a molded slab for fire-proof structures, formed of lime, plaster, ashes, and alum, and provided with a wire net, A, a tenon at one end, and a groove at the opposite end, as shown.

In testimony whereof I have hereunto set my name in presence of two subscribing witnesses:

MICHAEL F. LYONS. [L. S.]

Witnesses:

J. K. OULAHAN,  
CHAS. C. STETSON.