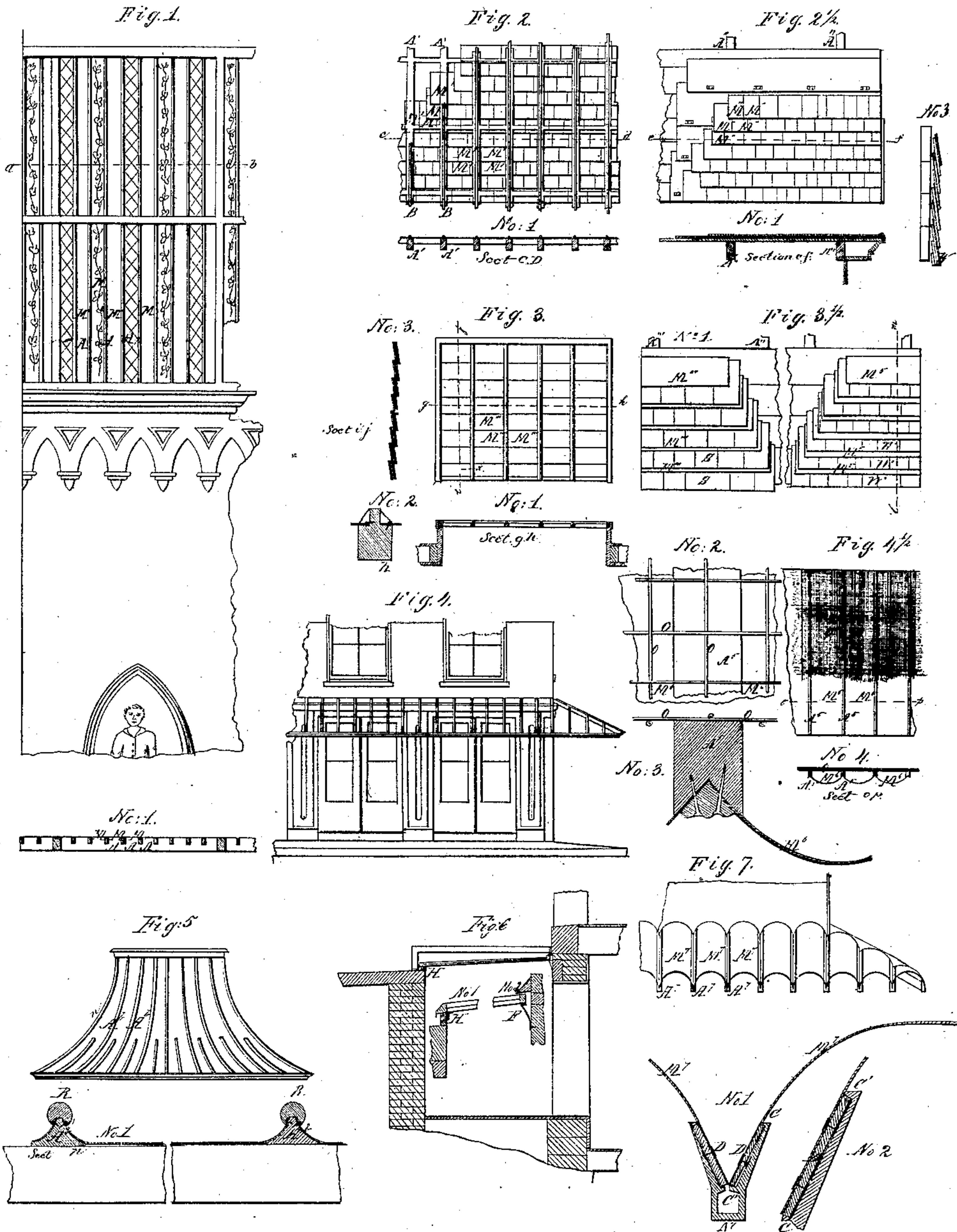


W. W. Beach,

Roof for Buildings,

No. 55,805,

Patented June 26, 1866.



Witnesses

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN ROOFS OF BUILDINGS.

Specification forming part of Letters Patent No. 55,805, dated June 26, 1866.

*To all whom it may concern:*

Be it known that I, WILLIAM W. BEACH, of the city, county, and State of New York, have invented certain new and useful Devices for Constructing Roofs of Buildings by Means of Plates or Sheets of Mica and its various combinations, accomplishing many novel purposes; and the herein applicant for Letters Patent affirms the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 shows a part of an inside view of a church where there are but few or no side lights, the roof being of mica, cementing, &c., that is transparent, translucent, semi-opaque, colored, &c., as hereinafter described.

Fig. 2 shows an outside view of a part of a transparent or translucent mica-shingle roof, with or without cementing, shaped by trimming, but not ornamented, &c., as hereinafter described.

Fig. 2½ shows shaped opaque mica shingle on felting paper or cloth, or with only sheathing or flooring metal or other foundation.

Fig. 3 shows a many thin-layered mica shingle, with or without transparent cementing, for trap-doors, skylights, &c., as hereinafter described.

Fig. 3½—No. 1 shows one plan of any colored trimmed mica shingle intervened by one plan of the popular slate shingle. No. 2 shows one plan of any colored mica shingle intervened by one plan of wood shingle of the present day, or prepared-wood shingle, &c., as hereinafter described.

Fig. 4 shows one plan of a sidewalk roof-covering having transparent or translucent mica split into thin sheets and laid with or without transparent cementing, being lapped very much, &c., as hereinafter described.

Fig. 4½ shows one plan of groove or concave laid transparent or translucent mica, up and down, or clapboard lapping only, for sidewalk-coverings, &c., the rafters supporting a woven-wire or other light-transmitting floor of balcony, &c., as hereinafter described.

Fig. 5 shows a modified plan of Fig. 4½, in which the edges of the shingles of mica are turned up and protected by a grooved capping-rib.

Fig. 6 shows any of the aforesaid transparent or translucent mica roofs laid under gratings, floors, or similar open-work.

Fig. 7 shows a convex-laid mica roof, having a Y or V shaped section of joist-rafter, eaves-trough, &c., as hereinafter described.

My invention consists, in general terms, in preparing a series of roofings of sheets or plates of mica, or combination of mica and other sheet material, forming a fire-proof, transparent, translucent, opaque, or ornamental roofing, as hereinafter described, laid with or without cementing.

To enable others skilled in the art to make and use my invention and adjunctive improvements, I will describe the same more fully by reference to the drawings, having figures, letters, and marks thereon.

Fig. 1. For making the light-transmitting and ornamental roof I put the rafters (marked A) sufficiently close to support the covering of transparent mica, (marked M,) which is laid in as thin strata as practicable without reference to courses, with or without a transparent cementing between and upon the layers of mica. The ornamented parts are made by putting between or upon the layers or sheets of mica paint, paste, cement, tinsel, &c., of any desirable color or design. Each sheet is fastened to the rafters A by nails, spangles, or other fastening, or the whole is secured by outside cleats of wood or metal. I arrange the support-work according to the desired architecture and amount of light required. I increase the toughness and avoid the permeability by moisture by the use of cement between the layers and sheets of mica, sometimes drying the cement by artificial heat after the cement is applied.

Fig. 2. This roof is made with transparent or translucent sheets of mica (marked M') laid in courses like wood shingle, the sheets also lapping each other laterally or not, with or without transparent cement between the layers and sheets of mica, with or without an outside or inside coating of transparent or translucent varnish, paint, or other coating material, the whole secured to a frame-work of rafters (marked A') and cross-pieces by nailing, as in laying wood-shingle roofs, or by outside cleats (marked B) of metal or wood.



Fig. 2 $\frac{1}{2}$ . Upon any close-boarded wood, metal, or other dark roof I lay a covering of one or more thicknesses of paper, felt, pasteboard, or cloth, which I fasten to the boards by nails, cleats, or spangles. Then I take mica of any color in sheets, and nail it, or cement it to the paper or other foundation, as described in Fig. 2.

Fig. 3. For skylights and movable roofs I lay and secure the sheets of mica as in Fig. 2, or lay with rails and nails and putty, in the ordinary method of securing glass in skylights, as seen in No. 2, section K. To toughen the sheets I make each sheet in several layers, alternated by cement.

Fig. 3 $\frac{1}{2}$ .—No. 1. I lay a course of common roofing-slate (marked S) in the usual manner of laying and nailing a slate roof. Upon this I lay a course of mica (marked M''') in sheets, lapping each other laterally, cemented together or not, and fastened to the boarding by small nails; then alternate with other courses of slate and mica to complete the roof. The slate may cover the whole of the mica or leave a part exposed. Roofs made in this manner can be of less pitch than ordinary slate roofs and be perfectly tight. Where serviceable but cheap roofs are required, I use ragged and imperfect slate combined with the mica, as above described. No. 2. I also lay mica with wood shingle, *w*, the same as with slate. I can use less shingle than on an entire shingle roof, besides making a nearly fire-proof roof.

Fig. 4. I make coverings for porches, verandas, &c., substantially as described in Fig. 2. I also lay the mica concave, secured to rafters grooved on the under side, as in Fig. 4 $\frac{1}{2}$ , Nos. 3 and 4, as hereinafter described.

Fig. 4 $\frac{1}{2}$ . I make balcony-floors of galvanized-iron wire, (marked O,) or other open-work, to let light through, lying upon and secured to rafters A<sup>5</sup>, of wood or other material. The lower edges of rafters are cut in the form of a  $\Lambda$ -groove section, as shown in No. 3. The rafters are placed at proper distances apart to receive the mica M<sup>6</sup>, which is laid bent concave, with sheets lapped up and down, as in laying clapboards, with or without cement between or upon the layers and sheets, and secured to the rafters by  $\Delta$ -cleats fitting the  $\Lambda$ -groove. I make other forms of grooves for the same purpose.

Fig. 5. I make the window-shade and other ornamental light-transmitting roofs by constructing a light frame-work to support curved or straight rafters A<sup>6</sup>. The mica is laid lapping up and down, as in laying clapboard, with or without cement between the layers and sheets, the side edges turned up and nailed to the rafter or rib. The two edges of mica thus brought near together over each rafter or rib are covered by a round or other shaped grooved capping, R, No. 1. The capping is secured to the rafter by nails or screws.

Fig. 6. I take any of the above-described

transparent or translucent roofs and arrange them under gratings or floors where light is desirable, permanently fixed in place or movable to admit of cleaning and ventilation. They can be made in sections swinging upon hinges (marked H, see No. 1,) and held in place by springs (marked F, No. 2.) Water falling upon them is conveyed to the sidewalk, or collected and conveyed where desired.

Fig. 7. I make corridor and similar roofs with rafters of cast-iron or other material made in Y or V section form, No. 1. Rafters A<sup>7</sup> are placed near enough together to receive the edges of the mica M<sup>7</sup>, bent convex. Each rafter thus becomes an eaves-trough. Mica is laid up and down, lapping-seam of the lap following the curve, with or without cement between the layers. The mica is prepared in sections of proper width to go between the rafters, and before it is put in place the edges are bound with metal strips (marked D) riveted to the mica. The metal strip is made to fit between the spurs C C' at the top and near the bottom of the groove, so that when the sections are sprung into the grooves they are held there by the spurs or bands C C' and by the edge of the adjoining section of mica. No. 2 is an enlarged section of one side of the Y-groove.

For cementing the various roofs above described, I make use of any cementing substances—such as varnishes, gums, glues, coal-tar and petroleum residuums, paints, &c.

In the citation of the invention, defining in what it consists, mention is made of the mixing of other material in sheet form with the mica; but in all such combinations where mica is used the principle, generally, is to preserve the native elastic character of the mica, which gives character to the roofing. It is mica roof versus glass roof—the strong for the weak. The inflexible glass is replaced by the flexible and elastic mica. While the glass is brittle, and can only bear the most gentle handling, mica is tough and elastic and bears handling well. These different characters in the glass and in the mica as roofing materials are sufficient to constitute a basis of claim for the use of mica as doing what cannot be done in the use of glass; but an additional point is gained by the mica for ornamenting by laying painted or figured ornaments under the outer coat of mica and between that and the inner plate or coat, as stated in the description.

Besides the transparent, the elastic, and the fissile character of my roofing material as substitute for glass, &c., I add that of using an elastic or flexible cement whose flexibility may be equal to that of the mica itself.

Having described the nature of the invention in my mica roofing, what I claim as new, and desire to secure by Letters Patent, is—

1. The use of mica or mineral isinglass, in sheets or plates, as a roofing material, trans-



parent, translucent, opaque, and ornamental, substantially in the manner and for the purpose herein set forth.

2. Ornamenting upon or between the plates or thicknesses of the mica, substantially as set forth and described.

3. Making an elastic roofing by cementing the plates of mica with flexible cement, substantially as set forth herein.

4. The combination of mica with wood, slate, or other equivalent substances, substantially in the manner and for the purposes herein set forth.

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Witnesses:

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